

RADIO

AND HOBBIES

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Editorial



AT the moment, it is generally agreed that the radio trade is having rather a thin time.

People do not appear to be buying radio sets in the quantities it was expected they would. Factory output in the main is far below expectations, although one or two have done well with a few lines. These have been mainly mantel receivers in the lower price field.

The net result is a feeling that radio has hit a slump, and needs a transfusion to bring it to life. That transfusion, it is freely expressed, will be the introduction of F.M. and Television in Australia. "We can't have them

too quickly," it is often said.

But is this so? Is the trade wise in relying on either of these things to lift its business? Because when the position is analysed, it looks extremely doubtful that the expected boom will come.

In the first place, one reason why radio sets aren't selling the way they should is their high price. It takes up to 50% more today to buy even a humble mantel set than it did before the war. From the public's point of view, today's sets are in no way better than pre-war models. They tune in the same stations, sound much the same, look much the same, are much the same.

The Australian public has bought plenty of radio sets over the years. It seems prepared to make do with what it has, and wait vaguely for something to turn up. It might be F.M.—it might not. All he knows is that he isn't spending money on a new radio. He finds today he needs his money for other things.

Would this position be changed if F.M. were here tomorrow, and sets to go with it? They would be costly, and on the whole wouldn't sound much different from A.M. sets. Those that did sound better would of necessity be in the high priced class—much higher than the best today, and it is just this class which is selling badly.

As for Television, its prime cost would make it a luxury anyhow, and it is so far into the future that conditions it will have to face can't even be predicted.

It would seem therefore, that the only way the trade can make sales improvements is the hard way—to make the public want to buy. An indication that new ideas are being exploited is shown in the production of personal sets, and a new table radiogram, which combines the facility of the higher priced radio with the convenience and lower price of the cheaper. But the requirements are still the same—price and utility, backed by intelligent selling.

To write in this vein is of course to invite the comment that all is easier said than done. Such comment does not remove the facts we have to face. Nor does it remove the danger which is to be seen and heard, that F.M. will be the saviour of the radio industry. The first step is to convince the public of the fact. It could and should make a heavy impact at the right time. From the radio trade point of view, that right time might well be a little later on when the problem of radio replacement will make a new radio a matter of necessity rather than of choice.

John Moyle

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In these days, goods of all descriptions are in abnormal demand and the radio industry is no exception.

Under these conditions, it is inevitable that there are some people who cannot be fully satisfied. Some of these people start looking for a reason other than the most obvious one—that the industry cannot immediately supply the inflated and unstable demand.

All sorts of tales come to light—some true, some with a vestige of distorted truth and others entirely false. You may have heard some of these yourself. You may have heard for instance, that Rola is exporting a large proportion of their production to newly found overseas markets.

Such is far from the truth, and we say quite definitely that Rola products are not going

out of Australasia, which corner of the globe, it is our bounden duty to serve.

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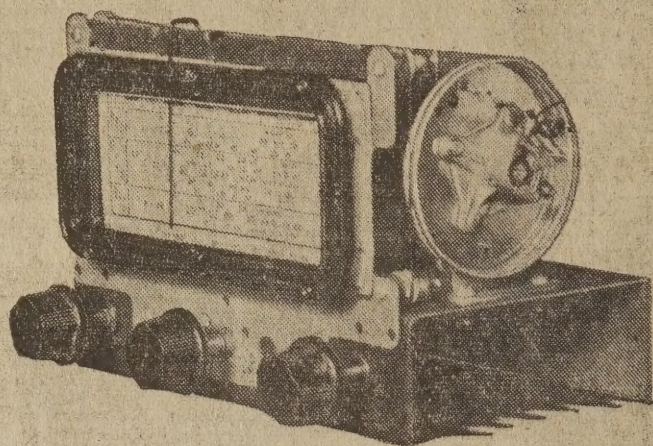
INVENTOR PLANS CAR TELEVISION



TELEVISION ENTHUSIASTS are finding a fascinating field in USA for experiment. Carl Brainard, for instance, plans to install a set in his motor car! He is shown here connecting up the picture tube. But then Carl is a versatile fellow. On page 7 you will find details of further devices he has built and installed in his home.

THE USL-37G

DIAL KIT



Now available in B/C & D/W,H with EDGE-LIT Glass Scale in Two Colors.

Illustration showing how the USL-37G dial Kit may be used with condenser gang placed parallel to dial plate.

Manufacturers & Assemblers will appreciate the saving of space when the USL-37G dial is used as illustrated.

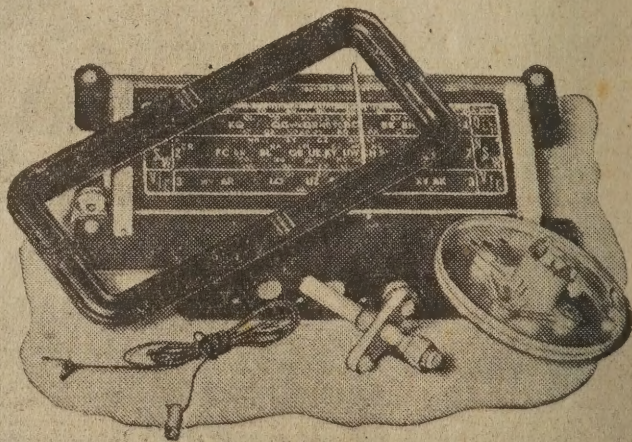
These dials are available in KIT form consisting of Escutcheon, dial plate, drum, spring and cord, and spindle assembly as illustrated.

A suitable Kit for your Portable or Mantel Radio.

Also available in B/C and D/W,H, with celluloid scale for battery Portable receivers where no illumination of scale is required. Type USL-37

Dimensions. 7in. x 4½in.

Escutcheon opening 5in. x 1¾in.



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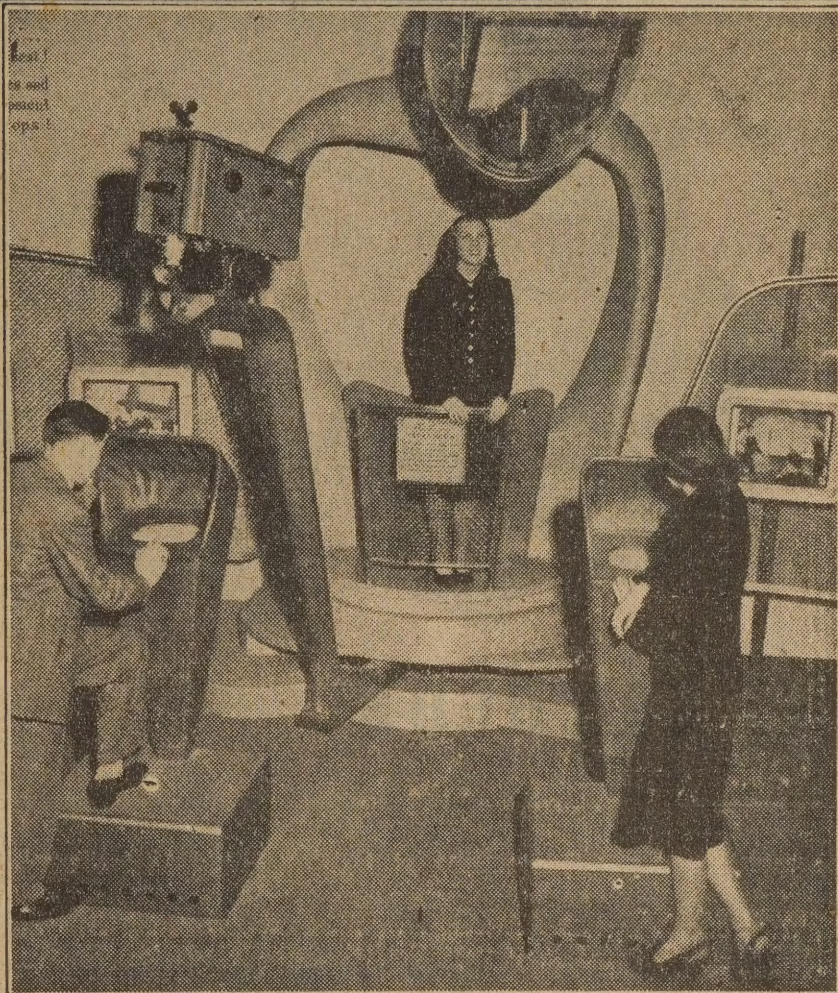
Television and F.M. are being steadily plugged overseas, particularly in America, where the major companies lose no opportunity of selling both ideas to the limit of their powers and ingenuity.

ONE of the chief of such displays is found in the RCA Exhibition Hall. In this hall all kinds of communication are dealt with in a lavish display, embracing such aspects of radio as ordinary broadcasting, recording in its various forms and for all uses, telecommunications networks and the application of radio devices to this end, radio-marine equipment in all its forms, in addition to FM and television.

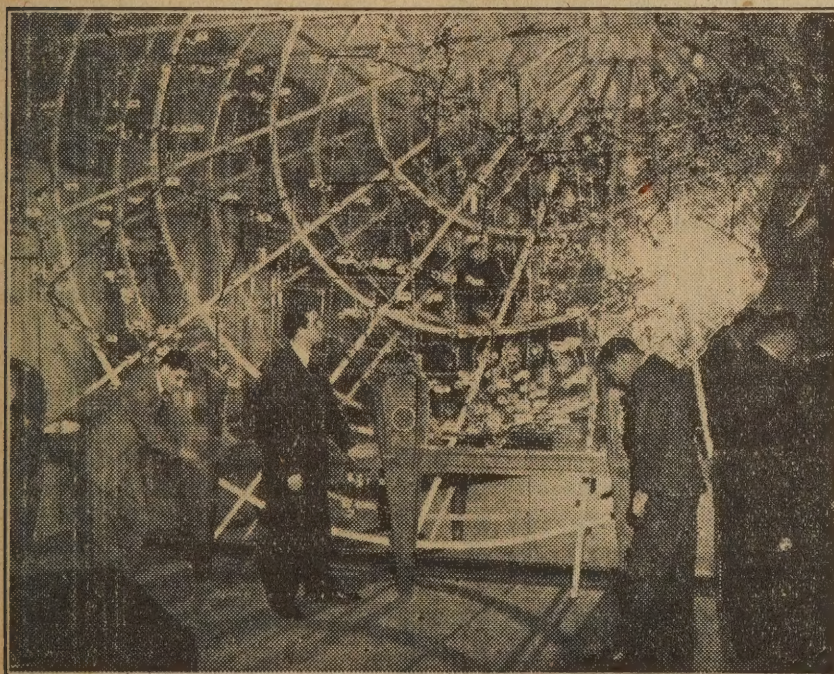
BROADCASTING

A most elaborate set-up illustrates the ramifications of the NBC broadcasting network. This takes the form of a skeleton map of the United States with every station represented by an illuminated point. A series of buttons are provided, by which the programme being fed to any one of these stations may be heard by the person who presses the button! A spectacular arrangement behind which a considerable amount of planning and technical thought has obviously been expended.

Another equally effective device allows a visitor to stand before a television set-up, which televises his or her image. This is repeated back over a receiving hook-up and the actual televised picture is visible to the "sitter."



Harriet Taylor sees herself as she would appear to a Television audience while being televised in the RCA Exhibition Hall. The Television camera (left) records her image and through electronic conversion it is transmitted to the screen of a television receiver, like the one in front of Miss Taylor. The two people in foreground are watching the process on other screens.

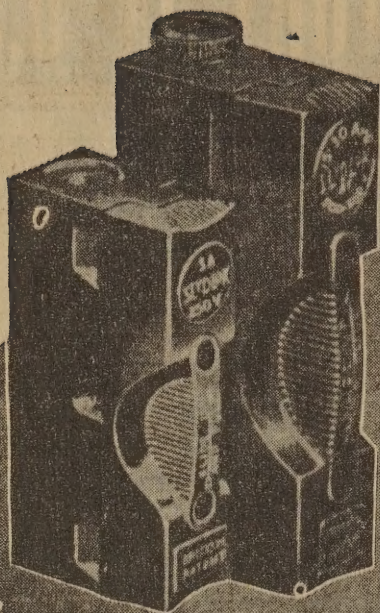


TELEVISION

From all reports there have been no major developments either in the technique or the sales of television in USA. Opinions still differ as to whether the black and white systems or color systems will ultimately be the most satisfactory. Australians who have seen both consider that color tends to become more tiring to watch than does black and white. In support of this, they instance the film world, in which color pictures are still regarded as being something extra, to be reserved for spectacular productions.

(Continued on Page 93)

The N.B.C. network map, lighted up to show every station in the system. By pressing a button, a person can hear instantly the programme being broadcast in the city he has selected.



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must be

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RADIO DOES PLENTY IN THE HOME

By remote radio control, Mr. and Mrs. Carl Brainard can start breakfast, turn on their radio or lights, open the garage door, or perform various other acts which give their home more than the usual comforts. The devices are controlled either from the house or from their car, by a telephone dial. Brainard, 25-year-old USA inventor who is establishing a wide reputation for his ingenious ideas, sees his home electronics as a practical peacetime use of radio control in the modern home. The young inventor became interested in electronics when he was given a crystal radio set for his 11th birthday. He ended his formal scientific education in the second year of high school. But by the time he was 19, he had developed a car telephone, and at 20, had installed electronic burglar alarms and other devices in the homes of movie stars. During the war he was one of those who developed the Army's radar ground control approach system, at Massachusetts Institute of Technology, and later became a Navy instructor in his speciality. Now he is employed by a die manufacturer who produces and markets his inventions, with a royalty for Brainard. These photos show some of his home electronic devices.

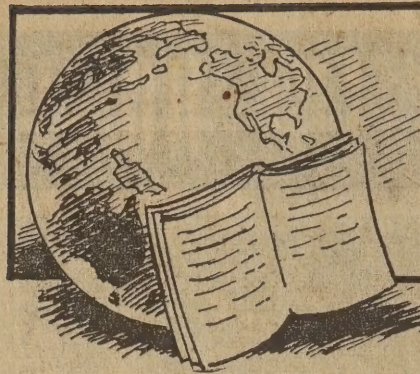
Right: Using a regular telephone, Joyce Brainard takes a call from her husband, Carl, who is en route home in his car. The phone connection and various other controls can be operated from a dial in the car while it is within a radius of 20 miles around the home.



Mrs. Brainard dials "one" to start the breakfast coffee, while her husband sleeps on. Most of the home's rooms are fitted with the dialling device.



Carl makes a connection on his "miracle light" which instantaneously transforms sound into light. There are 60 varicolored fluorescent lights, each made sensitive to a certain tone.



Technical Review

EMBOSSED RECORDING

A new miniature recorder manufactured by the Wagner Recorder Mfg. Co., provides 15 minutes of playing time on a disc only $3\frac{3}{4}$ inches in diameter. The grooves are embossed, rather than cut into the medium, and fidelity is claimed comparable with that from a standard 16 inch playback disc.

THE equipment was designed to meet the need for portable long-playing equipment with a fidelity requirement somewhat less ambitious than from the highest quality transcription discs. In line with this, the complete recording unit measures 7 inches long by $5\frac{1}{2}$ inches high by $2\frac{1}{2}$ inches deep, exclusive of the driving motor. The discs are $3\frac{3}{4}$ inches in diameter and .01 inch thick.

The grooves are embossed at the pitch of 515 lines per inch, the width of individual grooves being about 1.2 mills. To make possible this very fine pitch, a much sharper stylus is used than normal, the actual dimensions being as illustrated.

The stylus point does not remove any material from the disc, but the grooves are formed by actual deformation of the surface. This tends to form banks on either side of the groove, thereby aiding materially in the tracking during playback. There are no shavings or brushings to dispose of as with the normal method.

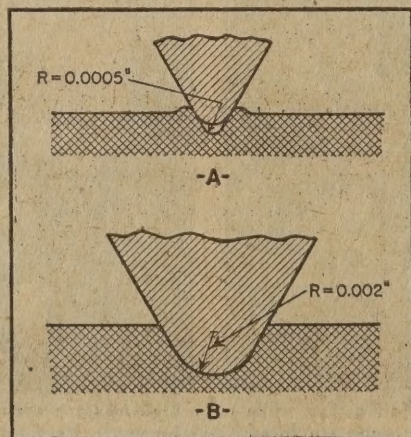
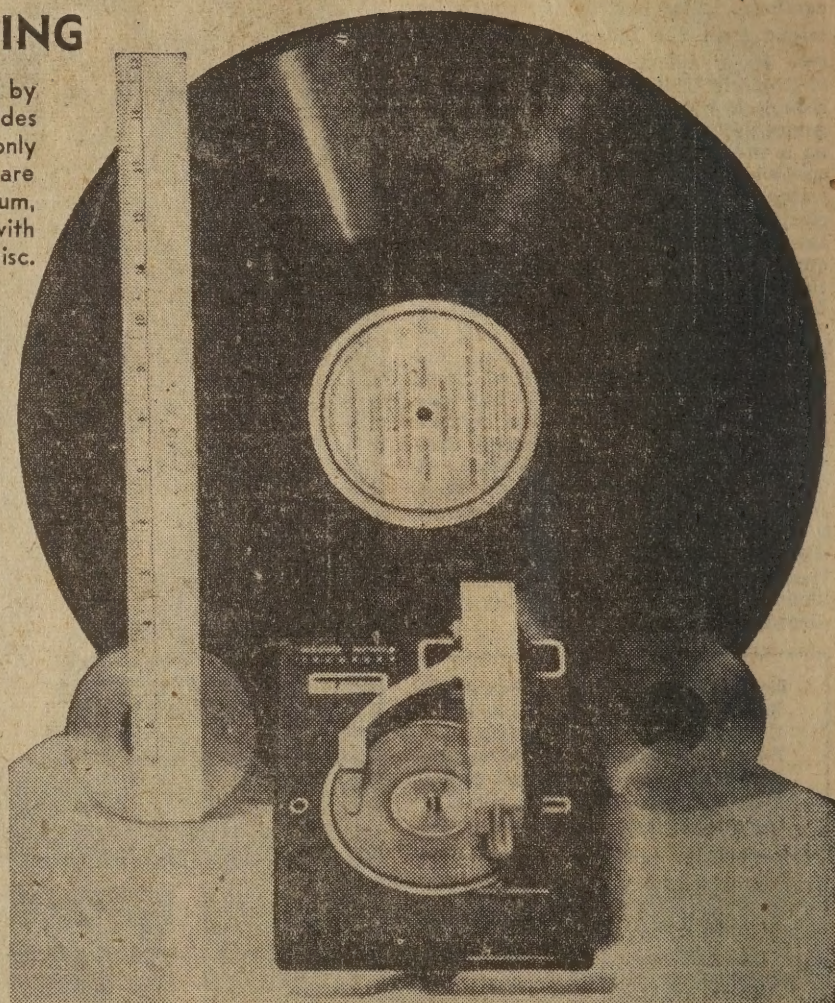
Another advantage claimed is that

A comparison between the complete recorder and a standard 16" transcription. Two of the small transparent discs are also shown. The lower illustration indicates the difference between them.

the method leaves the sides of the groove with more or less the original polish, eliminating a common source of noise. Wear on the stylus is said to be much reduced, so that it becomes a more or less permanent fitment in the head.

The same stylus is used for playback and recording, which ensures a close fit in the track.

Yet another interesting point is that the unit requires no elaborate lead-screw arrangement. The reverse side of the disc is pre-grooved during manufacture and this is engaged by a small chisel-shaped carbide tip at a point on the opposite side of the disc



to the recording head. A small, flat spring bears down on the top of the disc with sufficient pressure to ensure positive tracking.

A special motor is available to drive the turntable at 33 rpm, and a crystal cutter is used. No compensation is necessary in the amplifier itself to give frequency response flat within 5 db. from 30 to 10,000 c/s. Output from the head on playback is sufficient to excite directly a single 6V6-G output valve.

Double sided recording is made possible by placing a blank disc on top of the pre-grooved tracking disc, giving a half-hour playing time on a 5-cent disc.—From "Audio Engineering," May, 1947. ("Audio Engineering" is the new title for the familiar magazine "Radio."—Ed.).

THE NEW ELECTRONIC "MEMORY" TUBE

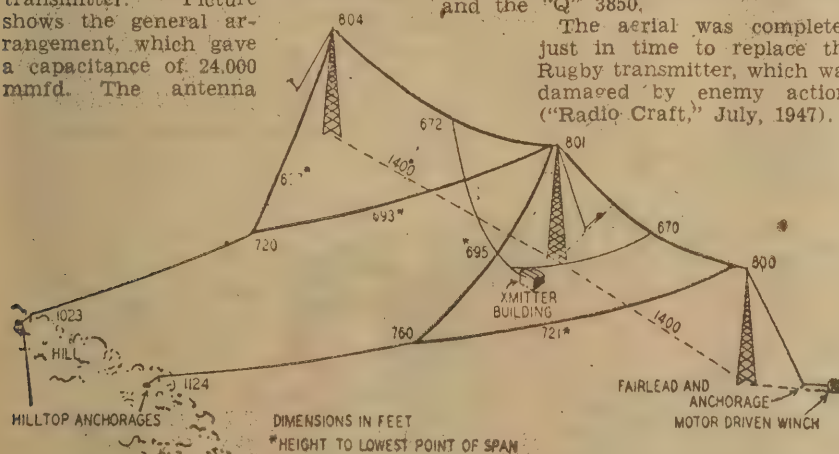
AT the recent American national IRE convention, RCA exhibited the selectron or "memory" tube. It employs 16 vertical and 16 horizontal grids which control 4096 windows in front of a sheet of sensitised mica. Charges may be imparted to the mica by adjusting the potentials of adjacent grids and the charges so applied remain stored for many hours. They can be "sampled" singly or as a group by suitable switching circuits.

MOUNTAIN SUPPORTS AERIAL

TO provide an alternative to the Rugby transmitter, the British Post Office adopted the novel step, during the war, of utilising a mountain range and three towers to support the enormous aerial system required by their 160 kc high-powered transmitter. Picture shows the general arrangement, which gave a capacitance of 24,000 mmfd. The antenna

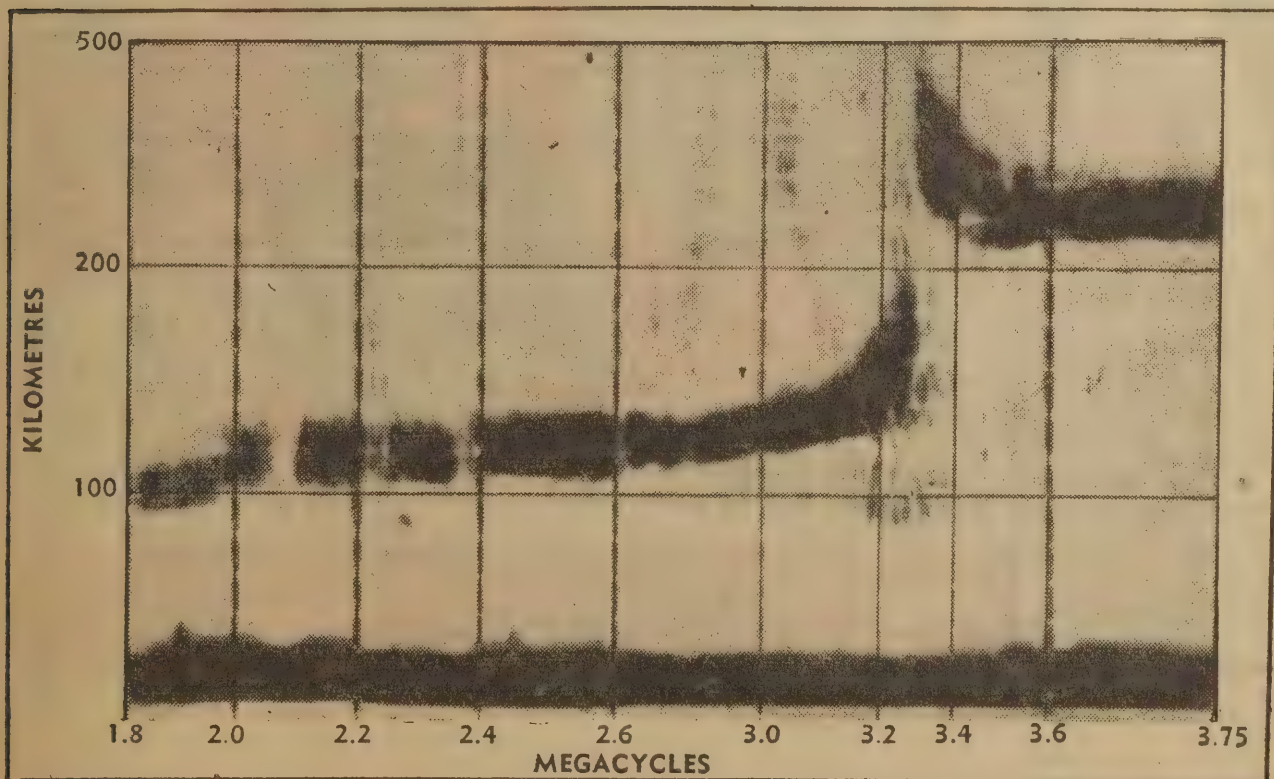
tuning inductor has a diameter of 15ft. 9in. It was wound with litzendraht cable containing 6561 strands with a diameter of 1.5 inches. The inductance is 5.36 mh, the hf resistance 0.14 ohm and the "Q" 3850.

The aerial was completed just in time to replace the Rugby transmitter, which was damaged by enemy action. ("Radio Craft," July, 1947).

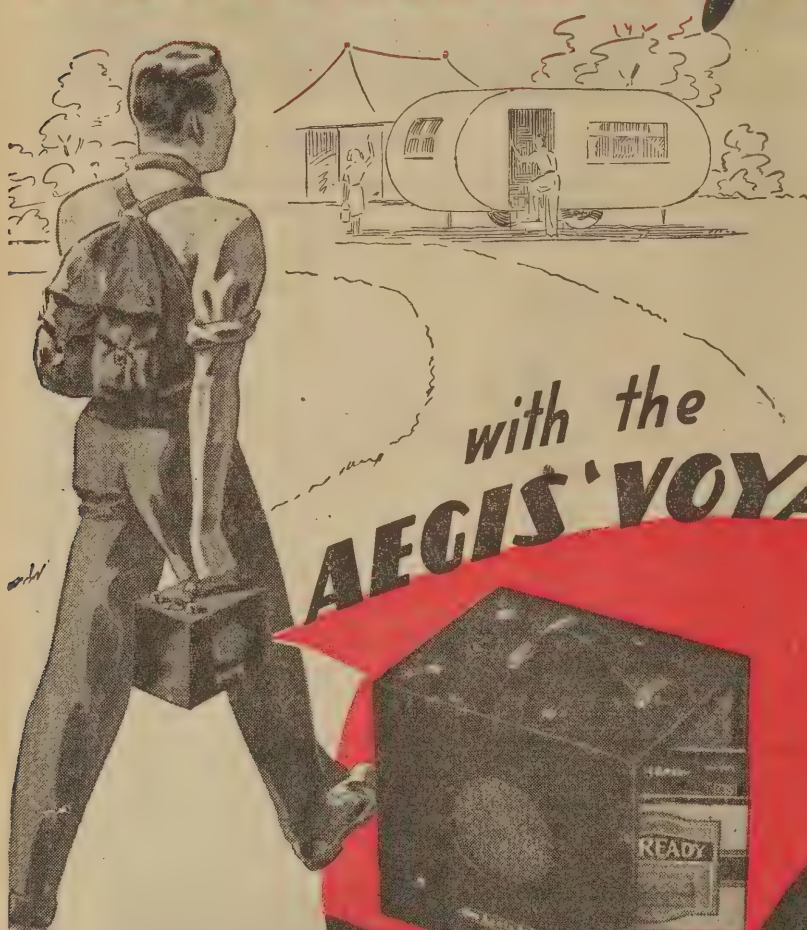


OBSERVING THE "E" LAYER

DURING the solar eclipse in November last, special equipment was set up at Boston to observe the effect on the E layer at local noon. The transmitter was a variable frequency power oscillator delivering a peaked pulsed power of 10 kw into a flat response resistance-loaded antenna. The receiver was installed in another building about a half-mile away and arranged to follow the frequency variations of the transmitter. Output from the receiver was fed to an oscillograph, using intensity modulation and combined with a continuous recording camera. A typical record is shown below, which reveals the critical frequency at the time as 3.3 megacycles ("Electronics," May, 1947).

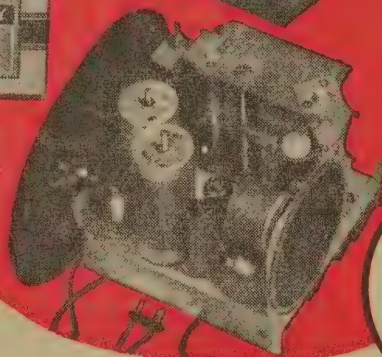
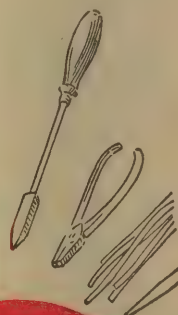


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NEW SYSTEM OF STEREOSCOPIC FILMS

The Natura—Stereo System

The 100 per cent. perfect stereoscopic film has arrived! Since films began, inventors and scientists have wrestled with the problem of cinematic stereoscopy—unsuccessfully: Now that it has been perfected, the three-dimensional film is going to revolutionise the world film industry.

The new invention, acclaimed by top-ranking British film technicians, will be in the studios and probably in full production before this issue goes to press.

But for the war, stereoscopic films would today be as commonplace as Technicolor. The experimental stages of the new process were passed in 1938, but production of the apparatus, which began the following year, was held up by the war. This year, films have been made with the completed apparatus, and have passed with flying colors exhaustive tests, which have failed to produce any weak spots, or to shatter any of the remarkable claims made for the process.

Invented by Mr. T. Maxwell-Harvey, the "Biopticon" natura-stereo process of twin-vision kine-photography produces convincingly natural stereoscopic films without any modification or addition to existing apparatus.

The descriptive title of the process, "natura-stereo," is derived from two of its characteristics—the third dimension of depth, or *stereo*, and "environment displacement," or the *natural* movement of environment in relation to itself, which has never been possible with "flat" films nor achieved in earlier stereoscopic efforts.

The Biopticon, a precision machine 5ft. in height, covers a floor area approximately 5ft. by 4ft. Powered by a $\frac{1}{2}$ hp 12-volt motor, it provides a floating base for the standard studio camera, which is oscillated between positions approximating to those of the two human eyes.

The action is "the complete external control of the parallax of the optic directional of the camera from zero to infinity. It presents to each eye, either singly (as in the case of a one-eyed person) or simultaneously, a pair of pictures so placed on the film—and ultimately on the screen—as to produce stereoscopic vision, as seen by a normal person in everyday life."

NEW PHOTOGRAPHIC QUALITY

A short demonstration film, made in Regent's Park, and recently shown to leading British film chiefs, reveals an amazing new photographic quality. Images are sharp at all distances, with true depth and perspective, and without distortion. The sharp definition of the picture and the reduced projection current which the process demands have banished from the screen the twin evils of eye-strain and screen-glare.

During the demonstration, a newly-processed American film, considered to be of a good standard, was run on a second projector, and shots of each film were screened alternately, with a projection current of 25 amps for the American and 7.2 amps for the

three-dimensional film. The contrast between the two was startling, and experts declared themselves frankly amazed at the superiority of the Biopticon pictures in every respect.

This demonstration film fully supports the inventor's claims that his process produces the finest photography possible, with total elimination of film grain, and the complete correction of all distortion.

In bringing the stereoscopic film to perfection, Mr. Maxwell-Harvey has removed many of the inherent faults of the two-dimensional film. Characters now appear actually to move nearer to or away from, the camera, instead of merely growing larger or smaller; a road or path on the screen does apparently wind away into the rear of the scene, instead of progressing from the bottom of the screen upwards; the legs of figures in the picture do not flicker as they walk or run, as they do, infinitesimally, but quite perceptibly, in "flat" films; and there is a convincing realism about the pictures, giving the impression that one is looking through an open french window at the scene outside.

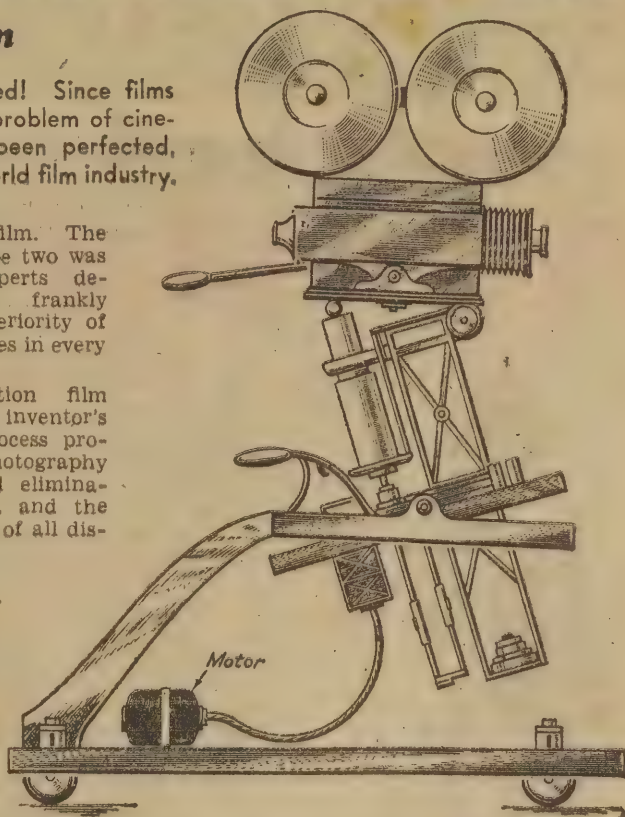
PRODUCTION ADVANTAGES

Many production advantages are claimed for the Biopticon also. In addition to the projector current saving of 70 per cent. it is estimated that production time will be cut by 10 per cent., and studio lighting by 80 per cent., with the new process.

The film's fine detail and faithful reproduction at all distances cut out focusing retakes, lining up for the camera, &c., and save studio floor time.

The extreme depth of focus all over the picture makes "back-lighting" unnecessary, and enables ceilings to be used on any set. The figure of 80 per cent. is the estimate of a famous British director of the proportion of studio lighting used for "backlighting" to separate artists from their backgrounds.

The total estimated saving in production costs—10 per cent. to 15 per cent.—will more than cover the cost of hire of the Biopticon apparatus, and royalties, so that the true cost of the process is nil.



A side view of the Biopticon

Biopticon improves both sound and color, by putting them in a more natural perspective, besides making more light available for color purposes. In the cinema, the reduced projector current provides a reserve of 100 per cent. to 140 per cent. of light for color (or smoke or fog), while on the sets at least 30 per cent. more light is made available.

At present, efforts to project each successive picture-frame on the screen in *exactly* the same position as the one before it, result in a "soft," out-of-focus effect. Fine detail, especially in the distance, is obliterated.

"SEPARATION DISPLACEMENT"

The success of the new process depends essentially on each picture occupying a position on the screen *different* from the preceding one. This "separation displacement," necessary for the stereoscopic effect, automatically corrects distortion by reproducing a sharply-defined picture in correct perspective.

At the same time, film grain is completely eliminated, making possible the use of any speed of film and any development in the processing.

The operation of the Biopticon is simple. The cameraman uses the camera in the orthodox manner, and controls the Biopticon range of 19 grades of stereoscopic relief by a single dial. He selects the required grade on the dial and it is automatically incorporated in the film.

When trick photography or stunts

(Continued on Page 93)

SUN'S RAYS ESSENTIAL TO HEALTH



That the action of sunlight rays is of far greater importance than the mere giving of illumination is not generally realised. When the full effects of such rays are studied it will be seen that although it may be possible for life to exist without illumination, it would certainly be impossible without the biological effects which sunlight rays have on all living things.

THE human race has become accustomed to look upon light as an optical phenomenon. It is used to see our way about in the darkness, for detecting burglars, and for motorists to see more clearly where to hit the pedestrian. In other words, to see what we are about, and for that matter, what other people are about, which is probably of greater importance.

LIGHT WAS FIRST

According to the story of creation no living thing was set upon the earth until there was provision for its perpetuation. The waters were gathered together into one place and the dry land appeared. But first of all there had to be light.

In the final analysis, all animal life is maintained by plant life, and the contention that light is the source of life is more clearly understood when it is considered that plant life exists only by virtue of the action of sunlight on the green coloring matter, chlorophyll, in the leaves of the plant.

This process, called photosynthesis,

is a matter around which considerable argument and experiment revolves. It is known what takes place within the plant, but it is not quite clear how it takes place.

Under the action of sunlight the chlorophyll makes a plant a veritable factory wherein complicated chemical processes are continually taking place.

The most vital function of chlorophyll seems to be the separation of the carbon from the oxygen in carbon dioxide. Everyone knows that a plant breathes in the carbon dioxide given off as a by-product of the respiration of other animals. In exchange for this, the plant gives off oxygen which is, in turn, used in the respiration of other living beings.

It is obvious then, that as only oxygen is given off by the plant, something must have happened to the carbon within the plant. It has been found that this reaction only takes place in the presence of sunlight. Further, the chlorophyll selects certain component rays of white light for its purpose, and red rays in particular.

These red rays bring about the dissociation of carbon dioxide, the assimilation of carbon, and the liberation of oxygen.

CARBOHYDRATES

Carbon, in the presence of salts dissolved in the sap, seems, first of all, to form carbohydrates, the simplest carbon compound found in a green leaf.

From this point there is a continuous synthetic process taking place within the plant during which many chemicals are built up, including proteins, amides, and many others ultimately concerned with the metabolism of the plant.

When the plant is consumed by man or other animal, these salts, with the vitamins and so on, are used for the nourishment of the animal, and thus we return to the contention that sunlight is the source of life, inasmuch as no plant life could grow without it.

It was mentioned earlier that the leaves of plants make most use of the red rays of sunlight, and it is interesting to know if other rays have any effect on living beings.

Considerable research has taken place during the last few years into the biological effects of certain radiations on human beings in particular, and I propose to give an outline of certain facts concerning what has become known.

WAVE SPECTRUM

The radiation from sunlight consists of waves of a great variety of lengths, ranging through the color spectrum from ultra violet to infra red. These in turn consist of waves having slight differences in length so that ultra violet light and infra red rays each consist of waves of varying lengths.

Not all these rays, however, reach the earth in full strength, as the atmosphere has a considerable filtering effect which reduces the intensity. This is particularly true of some of the ultra violet and infra red rays.

Any particular ray has little importance physiologically unless it is able to penetrate the tissues of the skin and act on those beneath.

Perhaps the best known of all rays are the ultra violet and infra red. The former is used consciously or unconsciously by sunbakers to produce the eagerly sought after tanning of the skin which is supposed to transform the wearer from an unattractive individual into an Apollo whose "sun tanned body reflects the glories of

SOURCE OF VITAMINS AND COLOR

virile manhood," notwithstanding that underneath the tan the "virile manhood" may be nothing more than an ordinary individual with low blood count and digestive upheavals.

INFRA-RED RAYS

Infra red rays are perhaps best known by those whose aching limbs and arthritic joints cry out for warmth. It is a very popular ray today for all manner of complaints. It is also used commercially for quick drying of paints and in many other ways where penetrating heat is required.

Ultra violet rays are very active both chemically and biologically, and act in much the same manner as radium or X-rays in being destructive in large doses. This property is made use of in the new sterilising technique, where concentrated ultra violet radiation will kill nearly all bacteria with a very short exposure of the ray.

The retarding effect of this ray on the growth of plants is seen on high mountains. Stunted growth in these regions was at one time thought to be due to low temperature and wind. But it has been proved that the ultra violet radiation in high regions is very much greater than at sea level, and this accounts for the stunted growth.

Plants at normal levels which were subjected to an artificial overdose of ultra violet rays exhibited the same stunted growth.

On the human body the property of ultra violet burning is the most important one and the mechanism of this burning and subsequent tanning is now well known. The ultra violet ray has a chemical action on the skin, destroying large numbers of superficial cells. There results a decomposition of the protein matter, the products of which are diffused to deeper layers of the skin. One of the by-products is histamine, which causes a dilation of the blood capillaries which in turn produces the red, inflamed appearance of the skin.

BURNING AREA

It is notable that the burning takes place only on the exposed portion and does not diffuse to other parts as in burning by hot water or dry heat.

Coincidental with the decomposition of the outer layer of the skin by ultra violet ray, there is a slight rise in temperature of effected part, and perspiration decreases. This is caused by a paralysis of the perspiration vessels by the decomposed protein. A large burn can cause shivers, fever and various blood reactions by absorption of the decomposed proteins into the body.

About two days after burning, pigmentation takes place. The lower layers of the skin give off fine grains

of pigment which migrate to the upper layers. These are lost by the scaling process that takes place in the upper layers, and new pigment grains are formed by chemical action.

The pigmentation helps to protect the skin from further burning but does not prevent the absorption of ultra violet radiation.

In climates where the intensity of sunlight is fairly low, such as in northern Europe, a disease known as

by Calvin
Walters

rickets is very common. It has been proved that the cause is the lack of ultra violet radiation, and treatment with this ray produced artificially, brings about rapid recovery.

Later it was found that the healing was really done by the provitamin ergosterin, commonly known as vitamin D, found in the skin. This vitamin was found to be activated by ultra violet rays, and even very minute

The exotic coloring of flowers, such as these orchids, would not exist without the chemical processes which require the sun's rays for their action. This is one reason why the tropics produce such beautiful blooms.



quantities of this vitamin in the skin, activated by the ray, restores the victim to normal, increasing the inorganic phosphates in the blood and decreasing the calcium. This latter makes treatment by the feeding of vitamin D rather dangerous, as it may cause calcification of the arteries. The ideal treatment, therefore, is by ultra violet ray.

According to Arthur Lippman, the development of goitre may be due, not so much to the intake of iodine, as formerly believed, but on the amount of ultra violet light received. This hypothesis seems to be supported by experiments on animals, which show that a decrease in ultra violet radiation received causes the thyroid gland to become very active, whilst the reverse is true also. The same author suggests that the intake of ultra violet radiation has some effect on fertility by some action on the glands that control the body hormones. He suggests that "the fact that the fertility of sheep decreases in the bright Australian climate makes this hypothesis appear probable."

RE-RADIATION

The effects of infra red radiation mostly confine themselves to the production of heat. These rays are of short or long wavelength and it is only the shorter ray that penetrates deeply into the tissues beneath the skin.

The long infra red rays have very little effect on the surface of the skin. Experimenters Sonne Hill and Campbell found that the therapeutic value of the longer rays was practically nothing. After exposure to these rays,



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The Philips "Log-Dial" mechanism provides positive, smooth running

with no slip or backlash. It has an ample reduction ratio for quick or slow tuning; calibration cannot be affected by mechanical troubles. The off-set Cursor provides instant logging without the need for scale reference or movement. The two-colour scale is removable and replacements are available. It may be mounted on front of or behind instrument panel. The Philips "Log-Dial" is designed for $\frac{1}{4}$ inch shaft drive but is adaptable to larger sizes. It is finished in Florentine Bronze.

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the temperature of the body 25 millimetres below the surface remained normal. Under exposure to short infra red rays, the surface temperature of the skin rose only one or two degrees but the temperature in deeper tissues rose three to four degrees and remained at that temperature for some considerable time.

MEDICAL VALUE

It therefore follows that the shorter rays are the only ones of value from a therapeutic point of view.

In the past few years attempts have been made to determine the reaction on the human body of the effects of colors. Color therapy has even been claimed successful in the treatment of disease.

We have all read at some time or other that the colors of the furnishings in hospital wards have an effect on the recovery of the patients. It has been claimed that red has a stimulating effect, blue a soothing effect. All of us have a certain reaction to particular colors. Some of us dislike yellow hair, while others prefer yellow, and so on. Why does a red rag stimulate a bull into a frenzy? It seems possible that as the eye is the organ for light detection, colors have some effect on the brain and, consequently, on the nervous system.

EFFECT OF COLORS

We know that the eye is the means of starting certain hormone reactions. The nerves from the eye to the pituitary gland in the brain are affected by certain radiations which in turn bring about changes in the hormone content of this gland. As the hormones of the body govern to a very great extent our reactions, what then more reasonable to suppose that colors affect us in this way by stimulating these hormones. It may be that when we men are attracted by a lady in a red dress the reaction may be only one of color attraction. The same lady in a green dress may have no effect on us whatever (or would she?).

Blue and violet rays are used to some effect in the treatment of wounds. The wound is stimulated to granulation and consequent rapid healing.

Color is nothing more than a vibration of a particular wavelength, and when these waves impinge on the retina of the eye, the brain does the rest and translates the impulse into what we know as color. These colors are in the visible light field and are quite distinct from the invisible spectrum in which exist the ultra violet and infra red. Nothing very much is known about the effects of visible light on the human body except those mentioned above, and at present any ideas about the matter would be mere hypothesis.

OTHER NATURAL RAYS

There are, of course, in Nature, other rays and emanations which have effects on the body.

There are the emanations from radioactive substances such as radium. Rays from radioactive substances are to be found almost everywhere at the surface of the earth. There are more

ARTIFICIAL SUN BRINGS HEALTH



The healing effects of sunlight are simulated in hospitals by the use of special which produce various rays found in sunlight.

on mountains than over flat country. The effects on the body are similar to those induced artificially by application of radium but in a much more "dilute" form. The concentration of these rays, used in medicine, are many thousands of times more than is obtained naturally. Nevertheless, there must be a reaction by the body to the continued application of these natural rays.

Cosmic rays, those mysterious rays that bombard us from outer space, have been blamed for various phenomena in the human body. The emanations are extremely small in quantity owing to the great distances over which they must travel. It has been estimated that the intensity with which these rays are received by the body is equal to the emanations given off by one-millionth of a gram of radium at a distance of several yards. This is almost immeasurable.

Nevertheless, a theory has been put forward quite recently that cancer may be caused by the continued bombardment of these rays. It must be remembered that these rays are extremely penetrating.

It has been found possible to alter the action of light of a particular wavelength by giving what are called "sensitizing" agents. This makes the

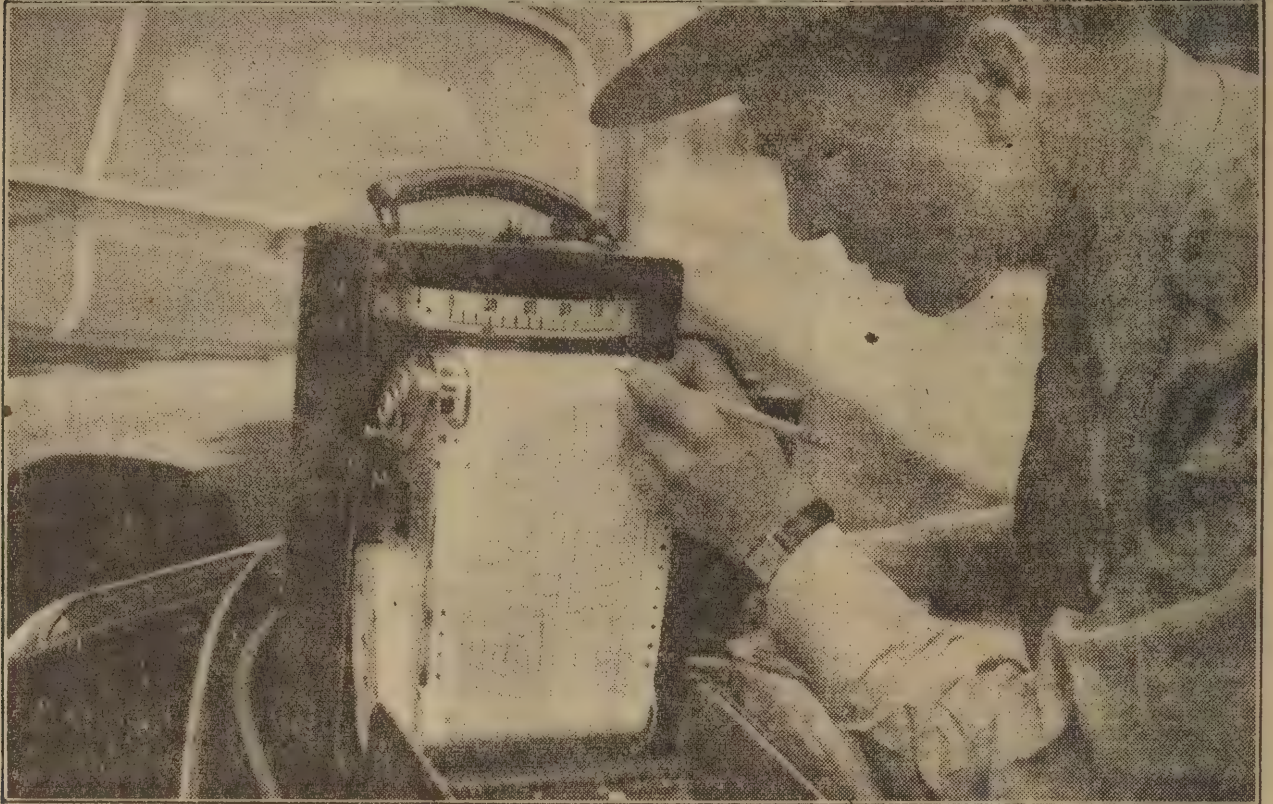
rays act more rapidly and reduces the time necessary to expose the patient when using rays therapeutically. The red dye, eosin, and a few other dyes derived from coal tar, have this effect.

There are many other types of radiation which have their peculiar effects on the human body, but which cannot be dealt with at this time. Mention might be made of the effects of natural electricity. Why are people affected during thunderstorms or changes in the weather? But this will have to be left until another time.

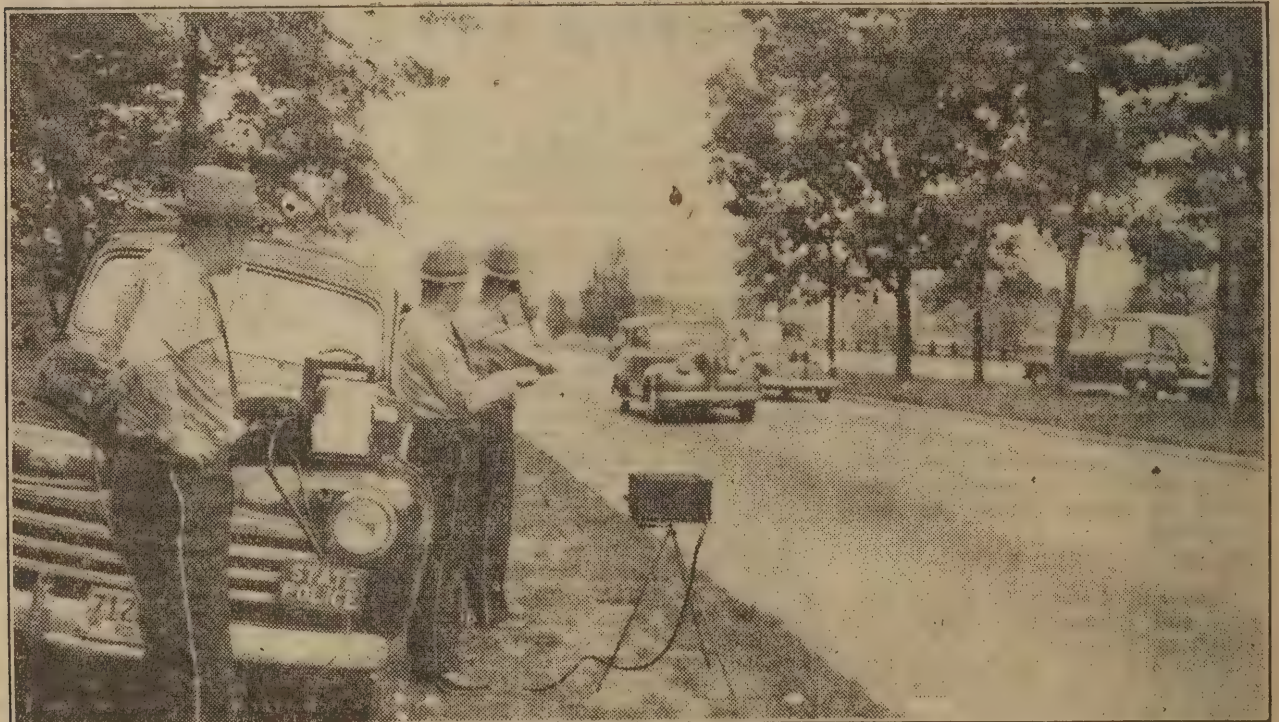
OUR DAILY LIVES

From the foregoing it will be seen that our daily lives are affected immensely by the emanations of Nature, particularly by the rays from the sun. When the ancients worshipped the sun as the giver of all life, did they know more than we do now of the effects of the sun's rays? From observations they must have known that plant life deprived of the sunlight, wilted and died, that human beings developed sickness and also died from the same cause. It is no wonder then that these people worshipped the sun, and today we still have our sun worshippers on our beaches and in the open spaces.

RADAR DEVICE CLOCKS MOTORISTS

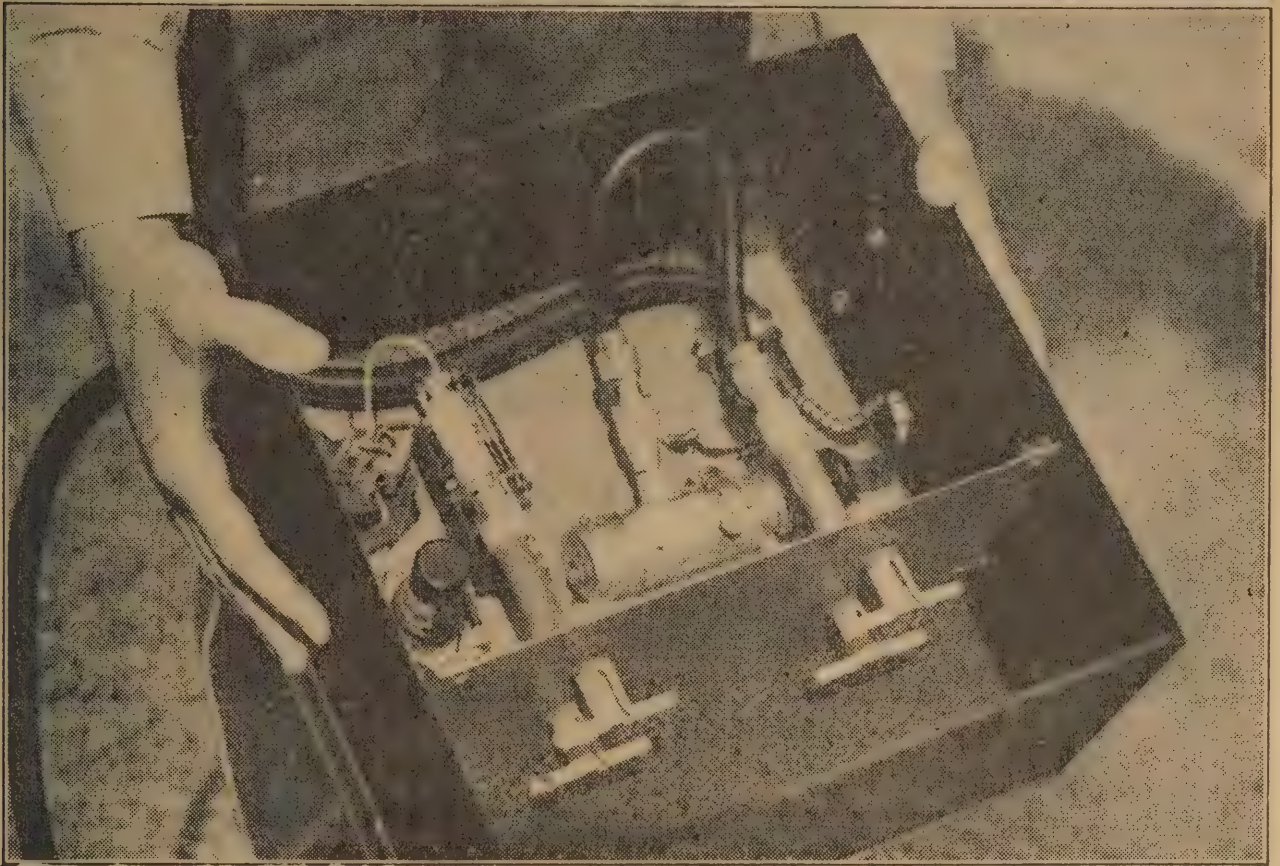


It soon may get tough to die from illegal speeding. A "Little Black Box" may do the trick. This device, called an electromagnetic speed meter, utilises war developed radar to clock within a two-mile accuracy the rate of any moving vehicle travelling up to 100 mph. From the small, compact box, which is easily concealed, and is attached to a recording device by a cable, micro-wave is beamed in a particular operation zone. All vehicles entering it reflect the wave, and the shift in the length from the original pattern is automatically printed on the linear scale of the recorder. The variation is translated into miles per hour. Both the transmitter and the recorder are powered by a storage battery, which may be the one from the car of the police, who monitor the instrument and note the licence numbers of speedsters.

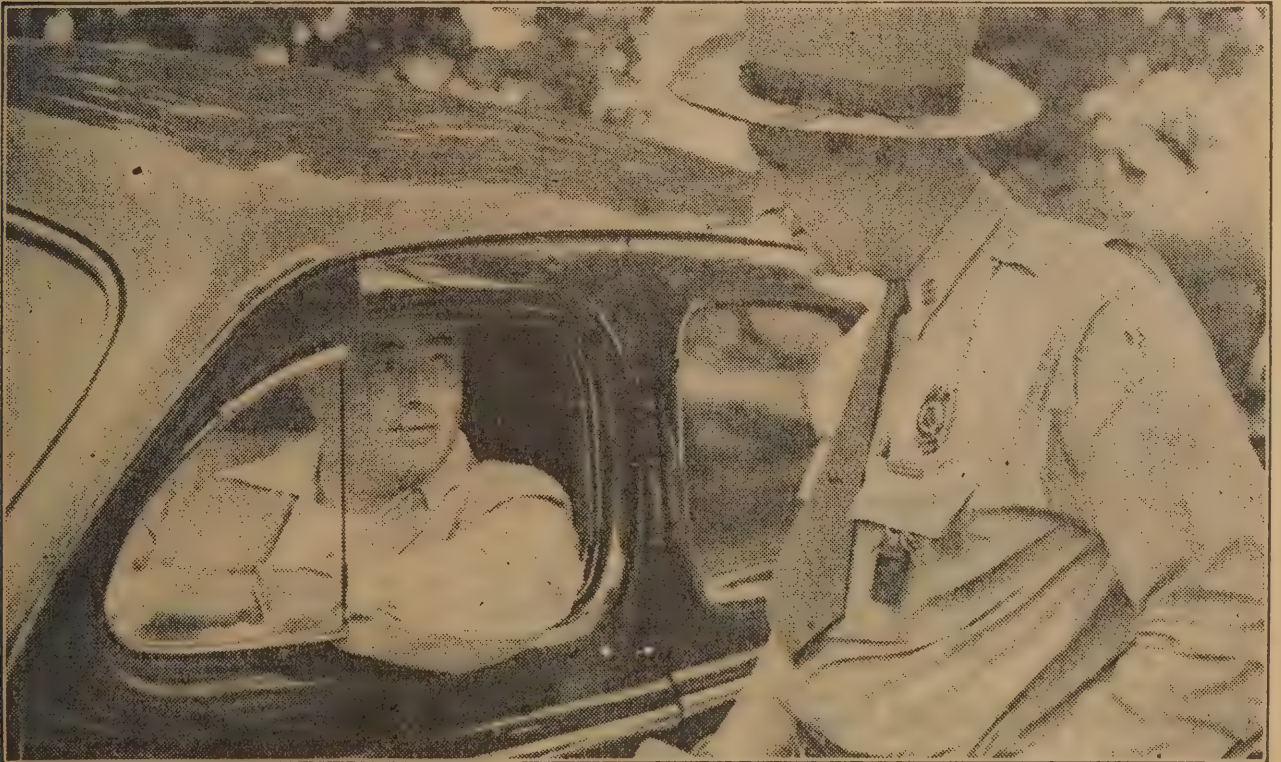


During a traffic test of a radar device designed to clock motorists, conducted by the Connecticut State Police on the Merritt Parkway, Trooper French notes the licence-plate of a car, whose speed is indicated on the recorder of the device, as 68 mph.

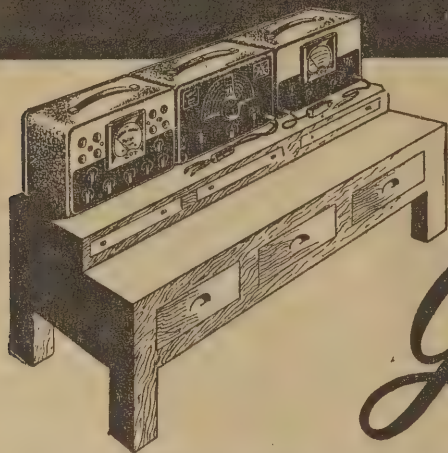
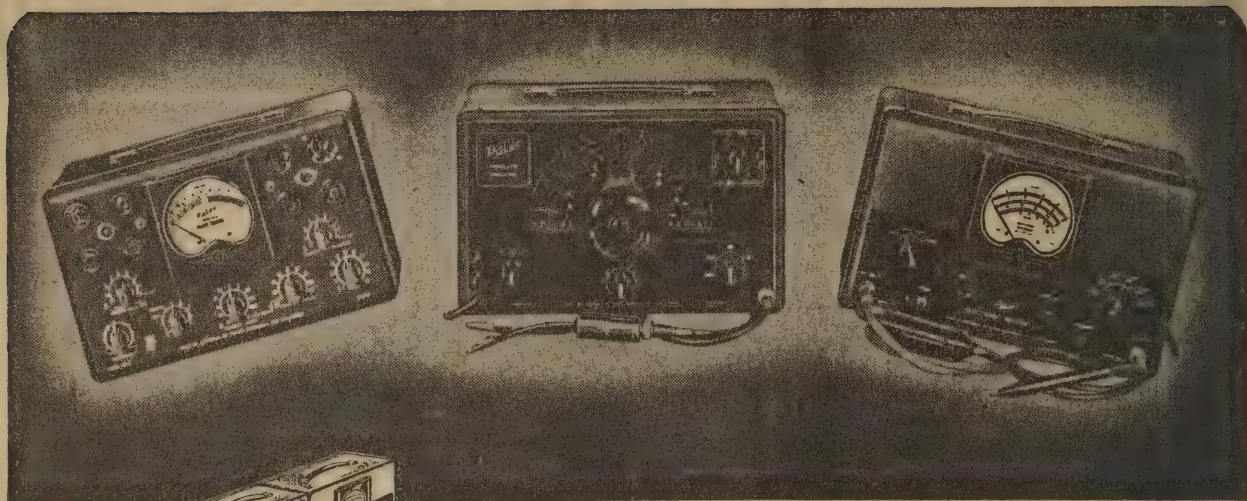
SCIENCE HELPS REDUCE SPEEDING



This is a close-up of the "Little Black Box" operated on the principle of radar, which is designed to clock motorists. At right, in front of the partition, is the antenna for the transmitter; at left, the for the receiver.



As part of the demonstration of a radar device in clocking motorists, Trooper Louis Jackman stops a motorist whose speed, as indicated by the recording apparatus of the device attached to the fender of the police car from which Jackman received a radio-telephone message concerning the offender, had been 68 mph.



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This compact, efficient valve tester, the latest model in the new series of Palec test instruments, is eminently suited for workshop, counter or portable use.

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Good for years to come. Selection of filament pins, irrespective of position on base, with full floating element selector switch—only one socket for each valve type necessary. Takes standard American valves, 7-pin button base and P and V Continental.

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General. Complete valve data booklet supplied, listing over 800 valves. Price: £19/10/-, plus tax.

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Range, 15 K/cs—30 M/cs in six direct reading bands.

Vernier Dial 54:1 ratio, calibration accuracy 1%.

Has cathode follower to prevent frequency modulation and attenuator reaction.

Signal generator pattern attenuator of five steps: impedance 11 ohms on lower settings.

Triple shielding and adequate filtering ensures a leakage of less than 1 microvolt at all frequencies.

Supplied complete with detachable dummy antenna, co-axial leads and 24-page instruction book.

Price: £32/17/6, plus tax.

Note: Each of these instruments is A.C. operated, 200-260 volts, 50 C.P.S., and can be operated from a battery by using external vibrator unit.

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Capable of quickly locating most obscure and elusive of intermittent, noisy, open or short circuits.

Checks all component parts and tests for high resistance insulation leaks. Used with Model M.O. oscillator or equivalent, traces signal and determines stage gain in every channel from mixer to speaker.

Note: Oscillator employed must have good attenuator characteristics. Ranges: (1) R.F.-A.F. six-range voltmeter: 0-2.5-10-25-100-250-1,000 volts A.C. Fitted with polystyrene bushed probe operating on frequencies up to 300 M.C. accuracy ± 0.5 db. to 100 M.C. Input cap., 10 uuf., loading equal to 6 megohms.

(2) High resistance D.C. six-range voltmeter: 0-2.5-10-25-100-250-1,000 volts D.C. Total load 11 megohms—giving over 4 megohms per volt on lowest range.

(3) Ohmmeter, six-range—from 0.5 ohms to 1,000 megohms. Detachable co-axial leads, 20-page instruction book supplied. Employs 4 valves. Price: £29/10/-, plus tax.

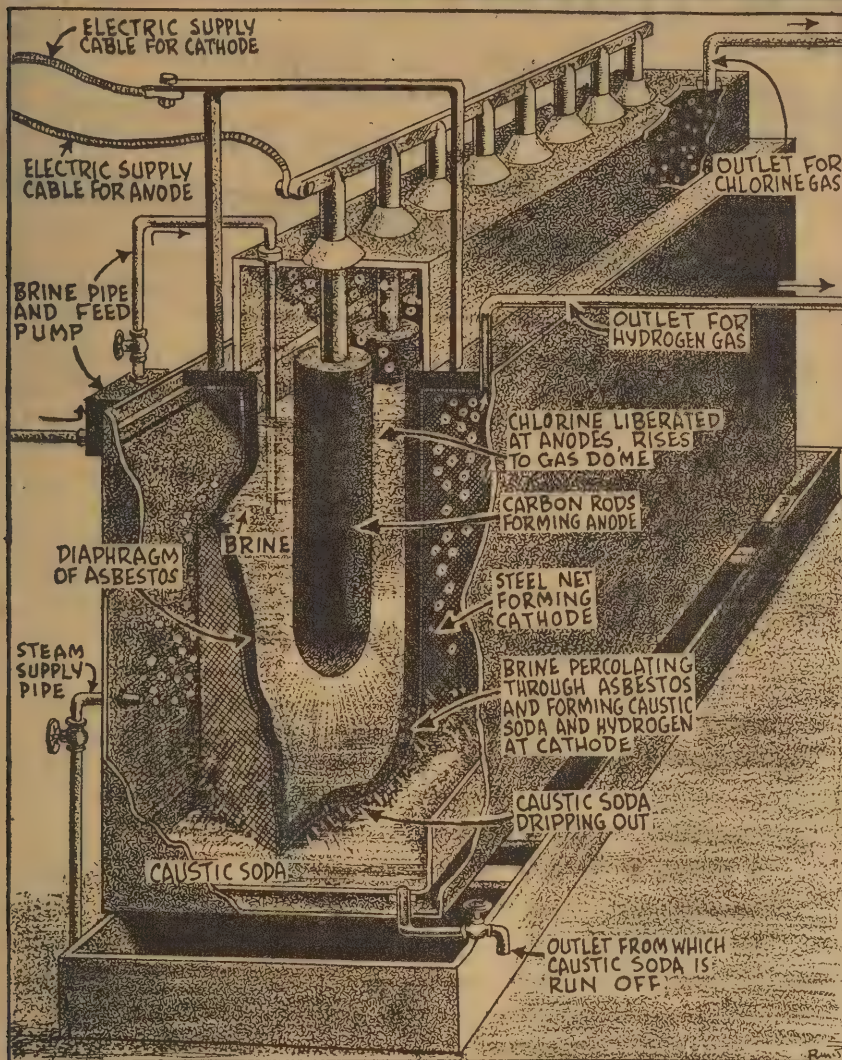
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P.18.FP

CAUSTIC SODA BY ELECTROLYSIS



Caustic soda is an hydroxide of sodium, which has been called "the grand universal alkali." A great number of compounds of sodium is utilised every day. Making caustic soda is one of the great chemical industries. Caustic soda, NaOH , is a very important material in soap-making. It is prepared in three ways, the most interesting of which is the electrolytic process shown here in diagram form.

IN a steel tank, a U-shaped vessel made of asbestos is suspended. The asbestos is covered on the outside by a steel net in the form of a diaphragm.

Lowered into the asbestos vessel are large carbon rods that form the anode (or positive terminal). The cathode (or negative terminal) is formed by the steel net.

Leading up into the steel tank is a steam supply pipe, and when the electrolytic process is under way, steam is blown in.

The U-shaped vessel, known as a Nelson cell, is fitted with brine supplied by a feed pump that keeps it at a constant level.

With the current on, an electric arc—the electrical discharge between two

terminals at different potentials — produces intense heat.

The brine gradually soaks through the asbestos, where it undergoes electrolysis — that is, it is decomposed.

CHEMICAL REACTION

Hydrogen and a solution of caustic soda are produced at the cathode, while chlorine is liberated at the anode. The chlorine rises into the gas dome and is piped away for drying. It is then compressed into cylinders for storing.

Sodium ions pass through the asbestos and are discharged at the cathode. Sodium thus formed is converted into a solution of caustic soda by the steam.

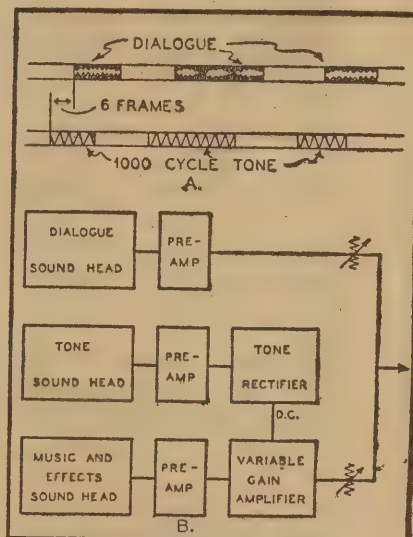
The caustic soda drips out and collects in the tray in the steel tank. It

BACKGROUND FILM MUSIC

To facilitate the rapid dubbing of films of the training type in which a narrator carries the main theme of the story but with a music or sound effects background, a unique method is employed by Walt Disney Productions.

THE main problem is to bring up the musical background during pauses in the narration, and to drop it when the narrator resumes. When the intervals are short, and come in rapid succession, proper dubbing necessitates the constant and tiresome watching of a footage counter to ensure realistic results.

The 1000-cps tone track is assembled in synchronism with the dialogue and the two tracks run simultaneously



with the music and effects track. The output from the tone track is then fed to a rectifier, and the d-c output passed to the grid returns of a variable gain amplifier stage using two 6K7 tubes. Time constants are arranged so that the fades take place in fifteen frames, the increase in background level requiring thirty frames.

The tone track is advanced six frames ahead of the dialogue track so that fades and increases take place in the most natural manner, avoiding unwanted quiet spots or quick changes in background level.

is run off through a pipe from time to time, and dried. Caustic soda is one of the strongest bases known. In the laboratory it is much used as a reagent in analysis, and for the absorption of carbon dioxide and sulphur dioxide from gas mixtures.

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NEWS AND VIEWS OF THE MONTH

FM on Parade

THE first public demonstration, if public is the word, of the Sydney experimental FM transmitter was given recently before members of the IRE at Science House in Sydney.

It took place during an excellent lecture presented by Mr. Reg Boyle, transmission engineer of the PMG's Department, as part of his discourse on the National Broadcasting system.

Mr. Boyle went to great trouble in providing a direct line from the studio, a standard broadcast set to receive 2FC direct, and an FM receiver to pick up the FM broadcast from a few miles away in Crow's Nest.

These three channels provided the same programme, which could be switched at will into a new Altec-Lansing loud-speaker system, which has acquired something of a reputation in sound reproduction.

During the transmission of a military band recital the audience was given the opportunity to hear the programme through all three systems.

AM is Good!

FROM the point of view of musical quality there was very little to choose between all three. The direct line and the FM were almost indistinguishable in quality and low noise level. The 2FC transmission, as might be expected, showed up with the highest background noise, but as the lecturer explained, this was due largely to the operation of some factories working nearby.

From the noise comparison point of view the test was hardly a fair one. The field strength from the FM station was very great, and had it used AM the absence of noise level would certainly have been equal to that of the FM transmission.

The main impression, therefore, was one of surprise that the regular broadcast was so good. We heard a frequency range which very few receivers in Sydney could equal, largely due to the superiority of the elaborate speaker employed. The lecturer's recital of the specification required of the 2FC transmitter, and others like it, were well borne out by what was heard. Actually these specifications are of such an order that any great improvement would tax the very finest reproducing system.

Public Gain

THE demonstration served to emphasise that without the benefit of the best audio systems, and their consequent high cost, the average listener is not likely to gain much in musical quality from FM stations when they are eventually in operation. It could have shown the superior noise-reducing feature of FM had the station not been so close to the receiver. The public will gain something

here if forced to operate its sets in noisy areas. Apart from that, nothing appears to have transpired to alter one's ideas that the benefits of FM will be rather to the trade and to the broadcasting system generally and not so much to the public.

At a later stage a demonstration of FM would be a highly interesting event, provided that it is carried out to show under typical conditions just what the differences may be. It is still as important as ever to see that the public is not given the impression that radio Utopia is round the corner. The full truth about FM is all that is required to make sure that such false ideas are not implanted too firmly in our minds. Most of the listeners to the demonstration thought the same way.

Uses of Radar

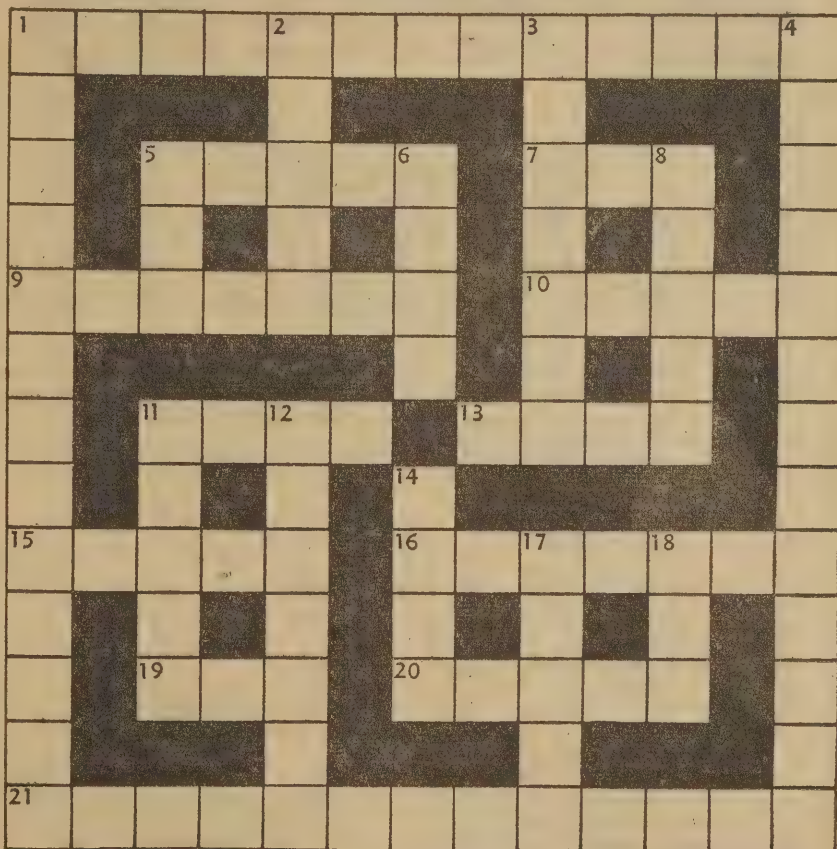
IN this issue you will find an interesting series of pictures showing how radio devices are being used to check the speed of motor traffic.

We don't wish to suggest that the law-abiding citizen should be worried unduly by such diabolical devices, although they certainly can assist in providing rapid and conclusive evidence of the road-hog's activities.

Rather, do they illustrate what we know to be true, that this remarkable wartime invention is capable of being put to hundreds of uses, all calculated to make our daily life safer, easier, and more economical of time.

In Australia, radar has not as yet found many applications of this type. A good deal of work is being done, par-

A RADIO CROSS-WORD PUZZLE



ACROSS

1. Effect of close following echoes.
5. Power flex.
7. Type of jack.
9. Self inductance.
10. Applied voltage.
11. Scope.
13. Hebrew letter.
15. Valve element.
16. Used for securing resistors.
19. Wireless.
20. Brings in stations.
21. Insulators.

DOWN

1. The process of changing AC to pulsating current.
2. Automaton.
3. Increase signal.
4. Magnet ends pointing south (pl.).
5. Conservation of energy (abbr.).
6. Dash.
8. Type of coil.
11. Small particles.
12. Combining form for electric.
14. Revise.
17. Type of altimeter.
18. Root-mean-square (abbr.).

FERGUSON'S RADIO PTY. LTD.

RELEASING

"VIBRAPOWER"

VIBRATOR POWER SUPPLY TYPE V.S. 140.

GENERAL. The Ferguson "Vibrapower" unit is a compact, self contained vibrator operated power supply designed to operate from a standard 6 volt accumulator.

The unit has been designed to simplify the conversion of battery operated radio receivers over to vibrator operation. However, it may be used as a replacement for "B" batteries in portable equipment, or as a complete power supply for standard vibrator receivers.

DESCRIPTION. A fabricated steel case measuring 9½" x 6" x 4" finished in grey wrinkle duco, and fitted with rubber mounting feet, houses the unit. A carrying handle is also fitted to the case for ease in transportation.

Weight 10 lbs..

ELECTRICAL SPECIFICATION. Two output circuits are provided, one is a filtered low tension 6V filament supply, which can be used with current drains up to 300 mA. The other is the normal high tension supply, which will deliver an output current of 20 mA (max). The output voltage under these conditions is 140 volts D.C.

Both L.T. and H.T. outputs are adequately filtered for A.F. and R.F. noise

INPUT

6v. at 0.95 Amp.

OUTPUT

140v. at 0.02 Amp.

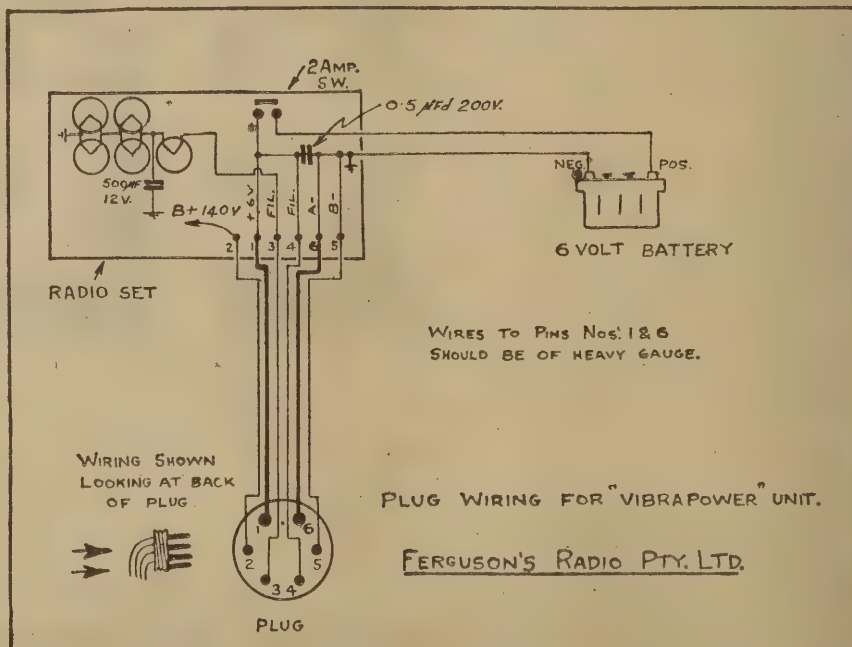
CONNECTIONS FOR USE. The input and output connections are made by means of a standard six pin plug, which is inserted in the socket provided at the end of the unit. Wiring to the plug is shown in the accompanying diagram. It is important that the recommended wiring to the receiver be observed, otherwise trouble may be experienced due to false earths, and "hash" may become apparent over portions of the short wave band. No trouble is experienced if the wiring diagram is adhered to.

OPERATION. Since the output voltage polarity is determined by the polarity of the input, it is important that the supply leads from the radio set are connected to the correct terminals on the accumulator. Incorrect connection will result in non operation of the radio, and damage may be caused to the condensers and vibrator cartridge in the "Vibrapower" unit.

One of the outstanding features is that either a Ferrocart Type P.M. 413 or an Oak Type V5124 vibrator cartridge can be used without any change in the operation of "Vibrapower."

When installing or replacing a vibrator cartridge, the six screws holding the base of the case should be removed, the lid slid off, and the cartridge inserted.

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ticularly by the CSIR, in adapting the principle to navigation, particularly air navigation. We hope soon to hear that someone has available the first of a series of radar equipments capable of providing services impossible without its aid."

FM for Amateurs

BEST news of the month for amateurs, if they will realise it, is that approval has been granted for the use of pulse and FM transmissions on certain of the amateur bands.

This is the first time that something really new in fundamental communication has been made available to amateurs. Already a number of them are planning to take advantage of it.

So far, no mention has been made of experimental transmissions of music. One of the interesting FM features is the ability it has to allow high fidelity transmission at low cost. We feel that the amateurs, within their own bands, should be allowed to experiment with this aspect as being a legitimate part and parcel of FM.

The PMG is not very anxious to grant this permission, and we feel that the main reasons are political. If this is so it is wrong, for experimental work should not be affected by such considerations.

We would like to see the WIA take up this matter in the near future. It should pay dividends.

For Mobile Work

WHILE on the matter of FM and interference, we were talking the other evening to an American amateur, who has a big job with one of the country's largest motor-car manufacturing concerns. He has been carrying out research into the use of radio for communication between motor vehicles, both with voice transmission and with automatic signalling devices.

He made the rather startling statement that, in his opinion, there was nothing FM could do in this connection, including the reduction of noise, that could not be done equally well with AM. This man has gone very thoroughly into the matter of noise suppression, and reports complete suppression of such interference in the region of 28-50 megacycles.

His private opinion of FM is that the word "ballyhoo" best describes it—a new thing which is being pushed to add a new line to radio business and sales.

While not altogether endorsing everything he had to say, it is decidedly interesting, in assessing values, to hear an experienced engineer giving voice to such views.

Incidentally, he reported that the 1948 cars would all be completely suppressed at the factory, to reduce automobile interference with FM and television services. A very good move, but what of the millions of cars already performing well as noise factories?

Q U I E T

P E R M A N E N T L Y

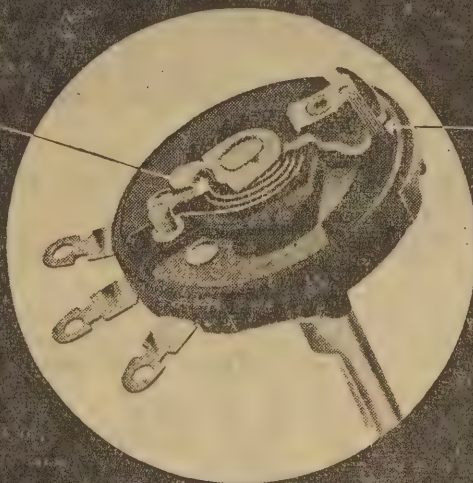
*Silent Spiral
Connector...*

NO SLIDE
NO FRICTION
NO NOISE

*5-Finger
"Knee Action"
Contact*

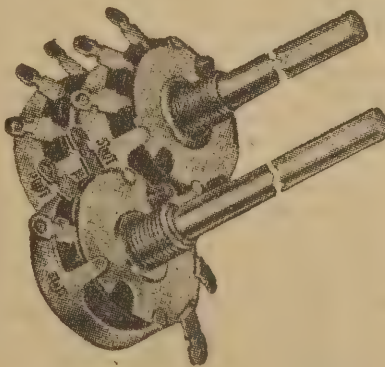


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PERMANENTLY
QUIET



IRC VOLUME CONTROLS

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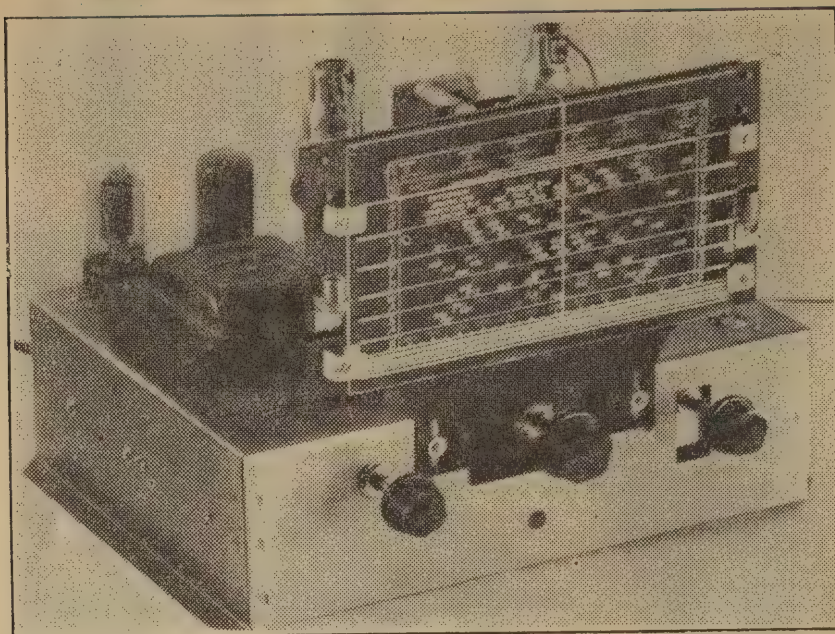
Study the design of IRC Metallised Controls. Note in particular the precision construction of the 5-finger "Knee Action" Silent Element Contact and the new Silent Spiral Connector. Each of these exclusive features means thousands of pounds in research by IRC engineers. Each means additional manufacturing expense—yet IRC Controls cost you no more than ordinary controls having neither of these noise-eliminating features.

It is "plus" values such as these that have made IRC resistance products famous the world over. By giving you the greatest value for your money, by doubly insuring you against customer complaints, we protect our reputation by helping you protect yours. That is good business for both of us.

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The set uses a new type of dial. Its layout allows all makes of coils and components to be employed in its construction.



verter valve goes immediately behind it, the rest of the components progressing around the chassis in normal fashion. This particular arrangement avoids any problem with the mounting of the dial and allows short leads between the converter socket, coil unit and tuning gang.

Some complication arises because of the difference between current types of coil unit. The one photographed in the original set has the iron-core adjustments protruding up through the chassis, being mounted into position by four 1-8-in. bolts. Other units either employ fixed iron slugs or have adjustments accessible from beneath, many of them using single-hole mounting. The chassis, therefore, has large holes in the top to accommodate the core adjust-

The 1947 ADVANCE

Here is another set in the true "Advance" tradition, a 5-valve superhet of the type so popular among suburban listeners. There are no fancy frills to the circuit, just a straightforward hookup that cannot fail to give results. Compared with last year's "Advance" it uses a modified chassis layout, incorporates a dual-wave unit as a standard fitment, a flywheel dial and permanent speaker. The audio system incorporates bass boost and there is no trace of a-c hum to spoil the reproduction.

FIVE VALVE superhets have been the popular choice for suburban listening for about 15 years, and the reason for the popularity is clear enough. Without being unduly expensive, they can play local stations under almost any conditions, and have a sufficient reserve of power and gain to make a good showing on interstate stations. Smaller sets lack this reserve power, while larger ones confer no apparent advantage for the ordinary listener.

CONSTANT DEMAND

It is little wonder, therefore, that we are constantly being asked for constructional data on this type of set. Short of reserving and distributing back issues, there is nothing for it but to feature a 4/5 superhet at regular intervals, each time making only slight amendments which may be necessary to keep in line with current developments or practice.

Electrically, therefore, all our "Advance" receivers follow the same general formula — converter, IF amplifier and detector, audio voltage amplifier, output valve and rectifier.

The differences between this year's

"Advance" and the 1946 version are mainly mechanical. Last year, we built the set on a current and very conventional chassis, using a simple type of dial movement. The trend since then has been almost exclusively to the use of the flywheel type dial, so that some change in this direction was indicated.

As we explained in connection with our "Radiogram" receiver, there is a marked difficulty in accommodating a flywheel tuning dial and a coil unit on the same chassis, with both mounted on the centre line. The alternative, in a 4/5 receiver, is to mount the coil unit to one side of the gang or the other, with the converter valve immediately behind it. The tuning knob can then occupy the central position, with the volume control to balance on the opposite side. If a tone control is to be used, it can be located underneath the tuning knob and clear of the flywheel mechanism.

THE CHASSIS

The new chassis measures 12 x 3½ x 9, and the tuning unit is mounted in the front right-hand corner. The con-

ponents where such are employed, and we are arranging to have it manufactured with a slotted hole in the front panel for use with single hole mounting coil units.

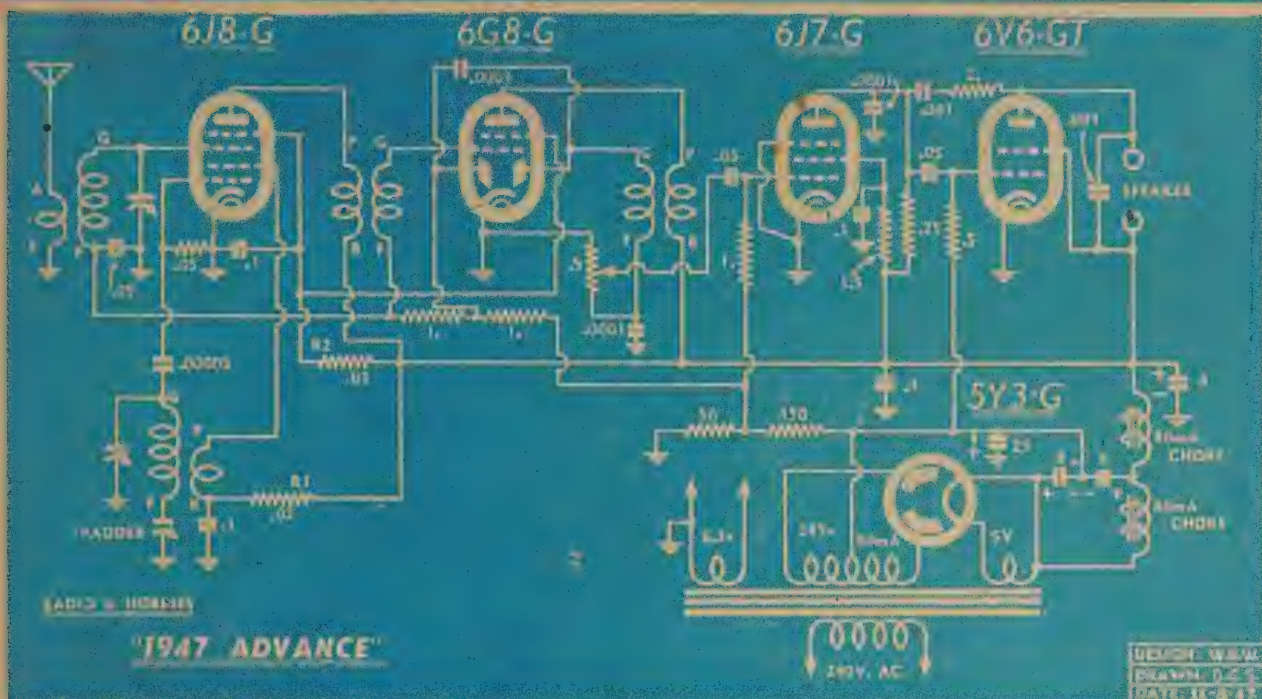
Another point of interest is that the gang condenser is held by a single bracket at the rear, front support being given by the tuning dial. This arrangement provides perfectly rigid mounting and avoids the difficulty of the front bracket fouling the flywheel.

TUNING CONDENSERS

Either a Stromberg or an AWA tuning condenser coil could be used, holes being provided in the chassis for both. The tracking law of the two condensers is not identical, and it is therefore desirable to obtain a dial with glass calibrated to suit whichever gang is used. Unless this precaution is taken, you will find that the dial can be made to track at both ends, but will be somewhat off the mark in the centre of the tuning range.

Mechanically there is not much else to say about the set, the rest of the layout following perfectly standard 5-valve superhet practice.

CIRCUIT SPECIALLY MADE FOR FLEXIBILITY



The circuit has been deliberately simplified without prejudice to good results. One filter choke would probably be sufficient, but we have used two for humless reception.

Reverting to the electrical circuit it will be seen that we have used a 6J8-G converter as first choice, mainly because this valve happens to be the most popular current type and in good supply.

We have departed from the 1946 circuit in using dropping resistors for the oscillator anode and screen supply in place of the 25,000 ohm voltage divider. With the low voltage power transformer in this version the bleed current provided by the voltage divider is not necessary and the potentials could be obtained more simply with a couple of dropping resistors.

In planning the circuit we have borne in mind that readers may wish to use valves other than those we have suggested as first choice and this may require some adjustment to the circuit constants.

CONVERTER VALVES

You could use the 6A8-G converter or a valve of that type without any change to the circuit and with very little noticeable difference in performance. The 6K8-G, on the other hand, would necessitate reducing the screen feed resistor from 30,000 to 20,000 ohms and increasing the oscillator anode resistor from 20,000 to 40,000 ohms.

For the ECH35 the oscillator anode resistor would be 45,000 ohms, or the nearest convenient value, while the screen supply resistor would remain at 30,000 ohms.

For the position of IF amplifier the 6G8-G is the conventional choice and no trouble should be experienced with instability, using conventional high-gain IF transformers.

Increased IF gain would be available,

however, by using the EBF32 (or EBF2-G) which has a transconductance of 1800 micromhos as against 1100 micromhos for the 6G8-G. The operating conditions for the two types are sufficiently alike as not to require any change in the circuit constants. Note, however, that the EBF2-G has different socket connections from the 6G8-G, even though both have an octal base.

DIODE DETECTION

Use of this type of valve allows the diode detection to be provided for in the IF amplifier stage instead of being mixed up in the wiring of the first audio valve. We have simplified the filter system in the diode circuit, as compared with last year's "Advance," but this does not in any way compromise the performance. Note that the lead between the second IF transformer and the "hot" end of the volume

control should be run in shielded wire, likewise the lead from the volume control to the 0.5 mfd coupling condenser and thence to the top cap of the 6J7-G audio amplifier. The shielding is a precaution against hum pick-up and instability and incidentally provides a certain amount of RF bypass in the circuit.

A.V.C. CIRCUIT

The AVC diode is capacity coupled to the detector diode and the whole system is returned to a tapping on the back bias network. This scheme allows the cathodes of the first two valves to be earthed, thereby saving four components or obviating possible feed-back if a common bias network were to be employed. The cathodes of the two audio valves are likewise earthed and bias taken from the same back-bias system.

PARTS LIST

- 1 chassis 12 x 9 x 3½.
- 1 2 gang tuning condenser.
- 1 tuning dial. USL 42 (or similar).
- 1 4/5 dual-wave coil unit.
- 2 455 k.c. I.F. transformers.
- 1 power transformer. 80 mA. 285V. ct. 285V., 6.3V., at 3 A., 5V. at 2A.
- 2 80 mA. chokes.

RESISTORS

- 1 2 meg., 1 1.5 meg., 3 1 meg., 1 .5 meg.
- 1 .25 meg., 1 .05 meg., 1 .03 meg., 1 .02 meg.
- 1 150 ohm W.W., 1 50 ohm W.W., 1 .5 meg. potentiometer.

CONDENSERS

- 3 8 mfd. electrolytics, 1 25 mfd. electrolytic 40 P.V., 525 P.V., 4 .1 mfd. tubulars, 3 .05 mfd. tubulars, 2 .001 mfd. mica,
- 3 .0001 mfd. mica, 1 .00005 mfd. mica.

VALVES

- 1 6J8-G, 1 6G8-G, 1 6J7-G, 1 6V6-GT, 1 5Y3-GT.

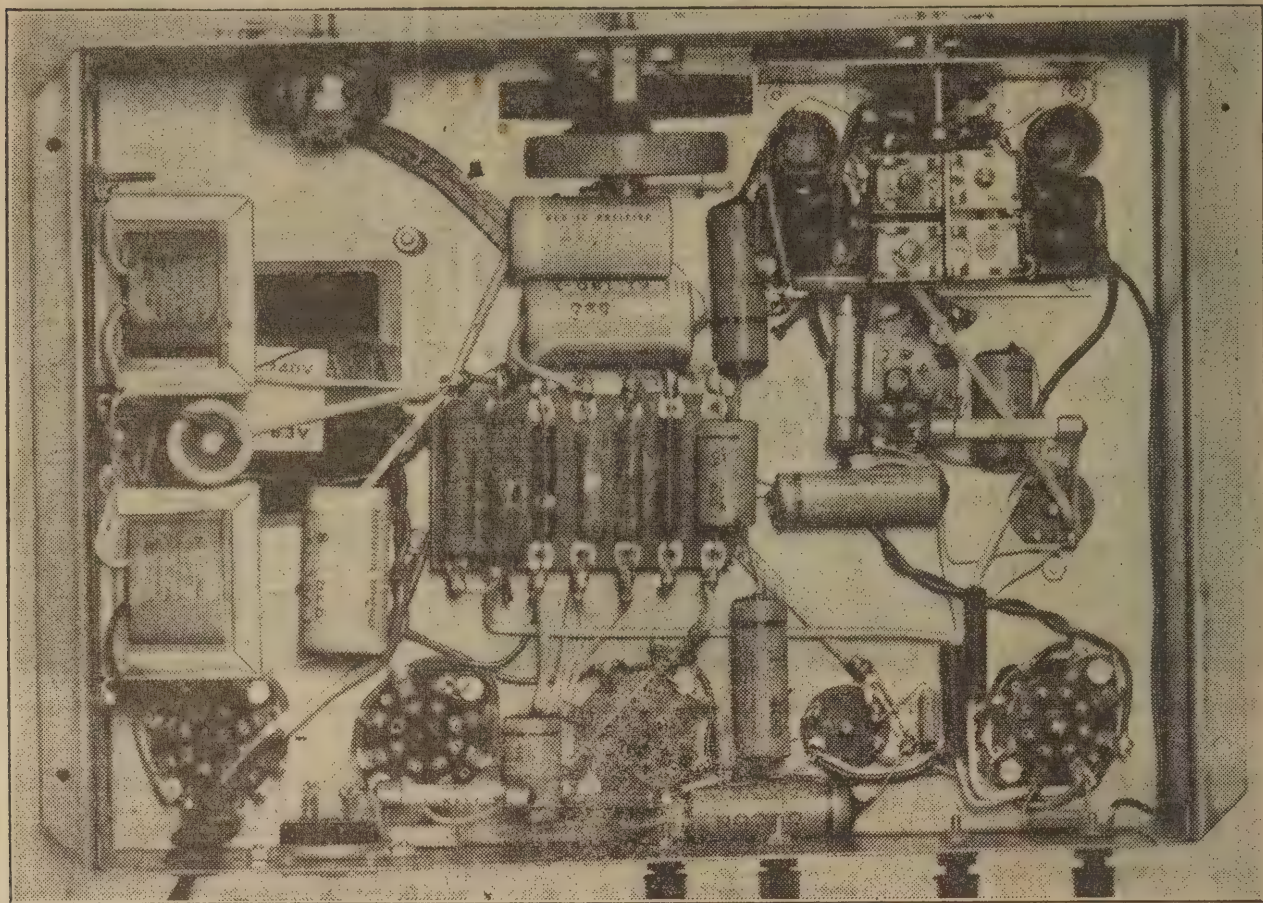
SPEAKER

- 8in. Perm. mag. to match 6V6-GT.

SUNDRIES

- 5 octal sockets, 1 4-pin socket, 3 valve cans.
- 3 knobs, 3 small grid clips, hook-up wire, power flex, nuts & bolts, 4 terminals, etc.

THIS PHOTOGRAPH SHOWS PLACEMENT OF PARTS



We have taken a great deal of trouble to layout the set logically and clearly. From this picture, you should be able to duplicate our work in almost every particular.

The 6J7-G actually operates with somewhat more bias than usual but no difficulty arises from this, since the

effect is largely obviated by the action of the series screen feed.

The 6J7-G is the obvious choice for

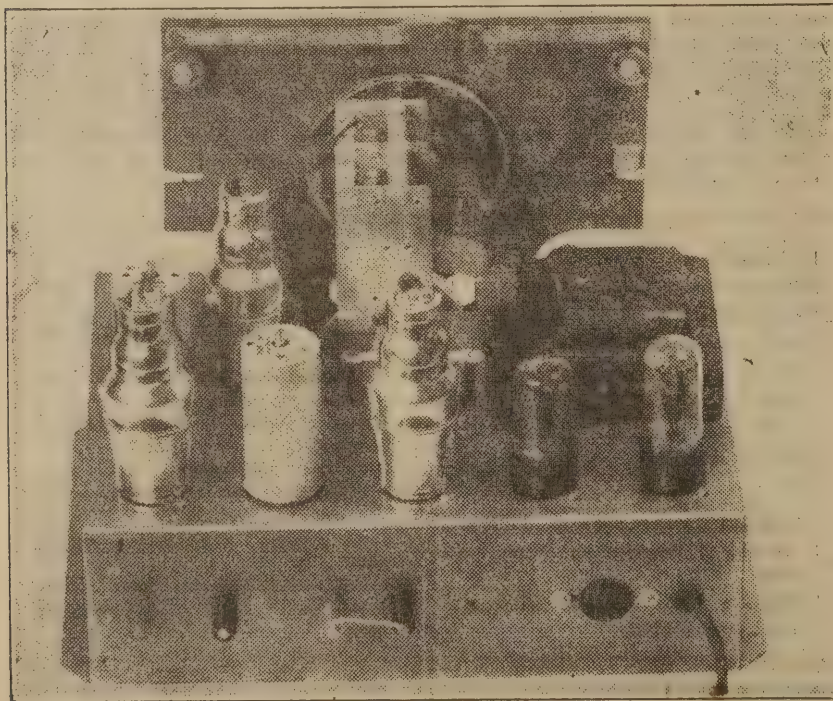
this stage and it is not likely that readers will want to use any other pentode for this position. However, you would find that most RF pentodes would work quite satisfactorily with the conditions specified for the 6J7-G.

The 6V6-GT is likewise a rather obvious choice for the output stage but some readers may wish to make use of either a 6F6-G or EL3-NG. The 6F6-G would necessitate increasing the 150 ohm back bias resistor to 250 ohms, while the EL3-NG would need a back bias resistor of 75 ohms in place of the recommended value of 150 ohms.

SPEAKER BYPASS

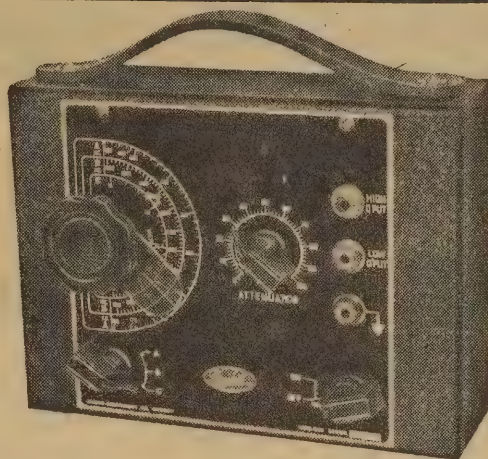
In the plate circuit we have omitted the tone control and bypassed the loudspeaker with a .001 mfd condenser as a measure of RF filtering. Another .001 mfd condenser has been connected in series with the 2-meg. feed-back resistor to provide a small amount of bass boost. You will find that the set has a crisp but full quality and there should be no urge to lop off the treble with a tone control.

The power supply system uses standard 285 volt 80-milliamp. transformer, 5Y3-G rectifier and two small 60 mil-



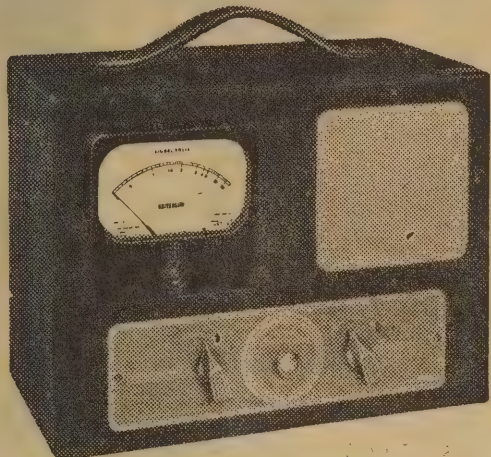
A rear view of the set gives additional details on the component disposition.

BUILD YOUR OWN OSCILLATOR



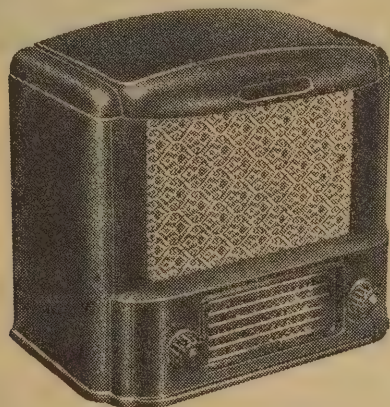
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4-VALVE A.C. KIT-SET

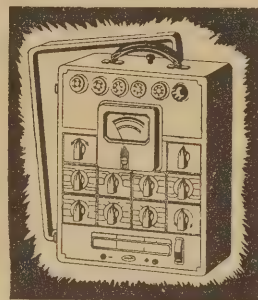
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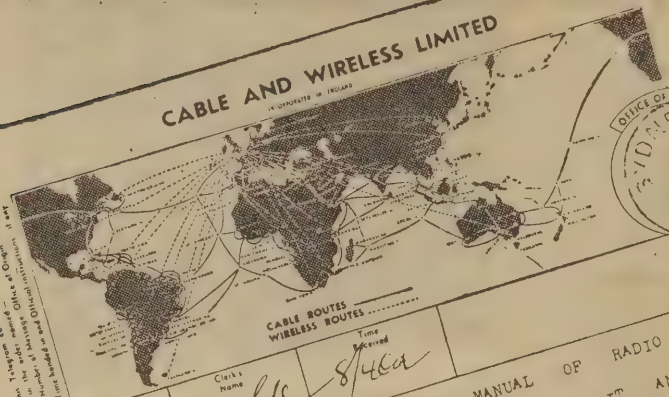
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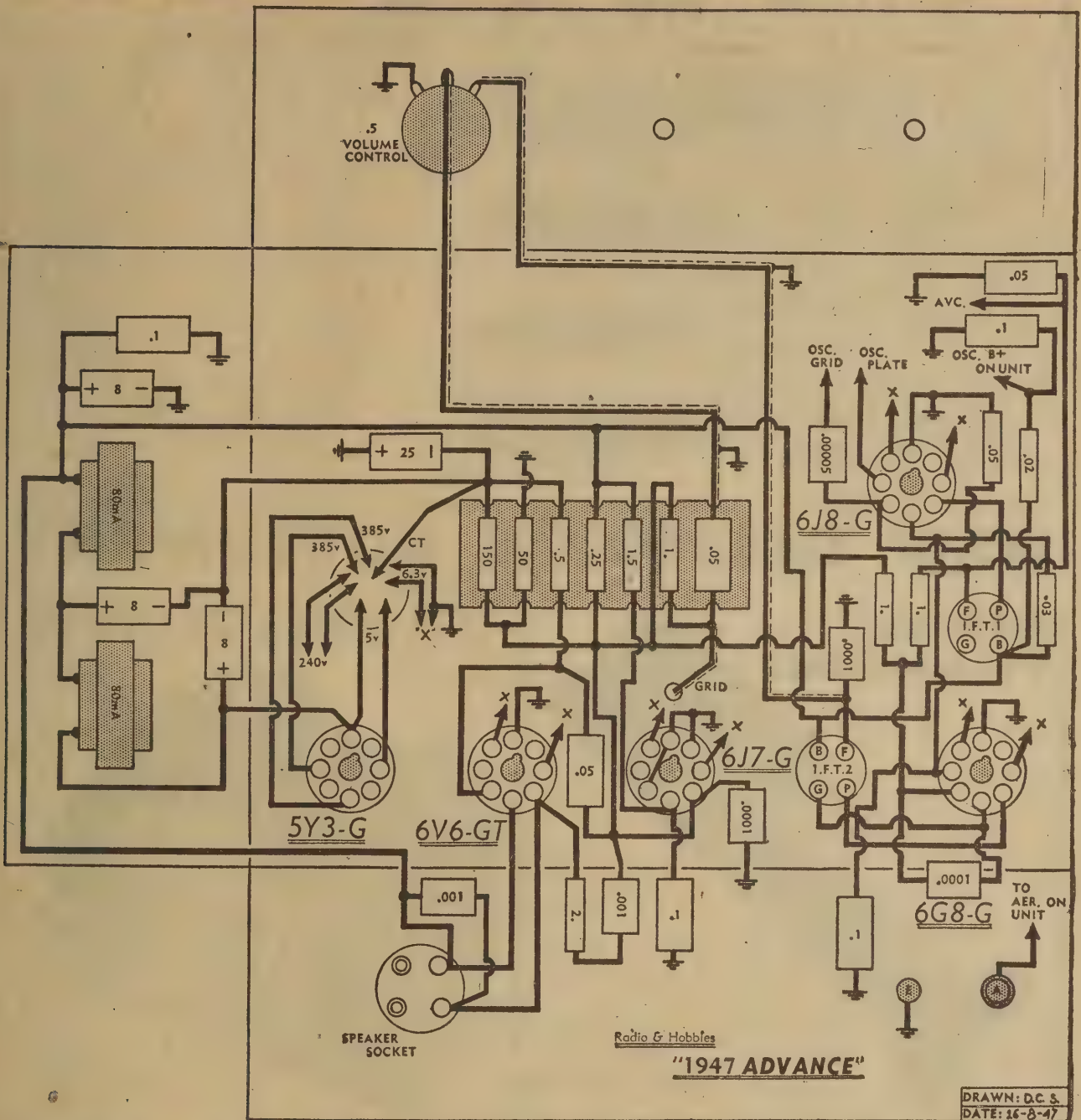
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WIRING DIAGRAM OF THE 1947 ADVANCE SET



This diagram, together with the photograph on the preceding page, should give you a good idea of how the wiring is done.

lamp filter chokes. With three 8 mfd. condensers the filtering efficiency is very good. So good indeed, that we could not hear the slightest trace of hum with our ear hard up against the loud-speaker. If you are not so fussy about hum level you could omit one of these chokes and even one of the 8 mfd. condensers, transforming the filter into a single section affair. However, we feel that the complete absence of hum is worth the extra few shillings involved.

From the constructional angle, the pictures and diagrams give a clear idea as to the layout of the components. Begin by mounting the sockets in position, taking care to include the bases for the valve cans under the mounting

nuts for the first three sockets. Note the position of the heaters, so that you will be sure to get conveniently short plate leads. Then mount the power transformer and wire up the heaters and rectifier socket and earth the cathodes to solder lugs under the socket-mounting bolts.

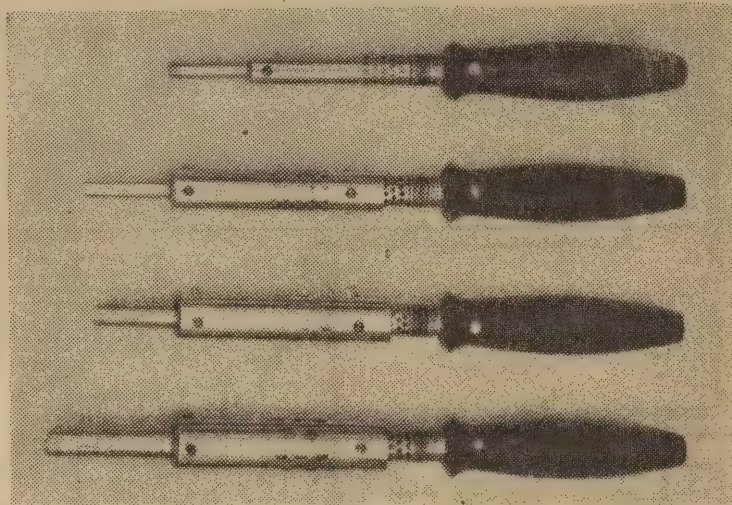
Mount the IF transformers, again taking care to see that the lugs are in the best position for short leads. Mount the filter chokes in position and proceed with the job of wiring. You will find that most of the bypass condensers can be soldered directly between the appropriate circuit points and convenient earth lugs. The same applies for a few of the resistors.

However, we chose to mount a 7-position resistor strip across the centre of the chassis to carry the components in the back bias network and one or two others connected with the 6J7-G voltage amplifier. There is not much point in mentioning each individual component, as the general arrangement of the wiring may be deduced from the underneath photograph and wiring diagram.

The dual-wave tuning unit can now be mounted in position and wired up, taking care to follow the connecting code generally supplied by the manufacturer. It is not feasible for us to give a separate wiring diagram for each of these units and readers will

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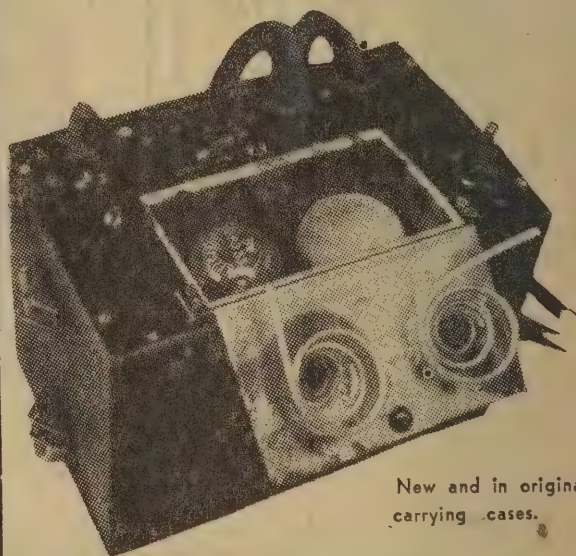


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simply have to co-relate the circuit diagram with connection data supplied by the individual manufacturer.

ALIGNMENT

The final job is that of alignment. If you have an oscillator on hand, connect the output lead to the grid cap of the converter, adjust to 455kc, and peak the IF transformers for maximum output. Be sure to keep the input low so that changes in level will be more easily apparent. If no oscillator is available, do not touch the IF transformers at this stage.

Transfer the output to the aerial terminal, set the frequency to about 1400kc and tune the oscillator or a station at about this frequency. Peak the aerial trimmer for maximum output and then tune the oscillator or a signal at about 600kc. If the coil unit has variable iron cores, adjust the aerial core for maximum output. If not, rock the tuning dial of the set and adjust the variable padder until maximum signal strength is obtained.

Now loosen the dial grub-screws and set the dial to tune accurately some known station at the low frequency end of the band. Tighten the grub-screws and swing the dial down to a known station around about 1300 to 1400kc. Bring the set into line with the calibrations by adjusting the oscillator trimmer and then peak the aerial trimmer for maximum output.

If the IF transformers have not already been aligned on an oscillator, carefully check their setting now for best results.

SHORT WAVES

Alignment of the short-waves follows the same general procedure, the aerial trimmer being peaked for best results towards the high frequency end of the band and the variable core (if any) adjusted at the low frequency end of the band. In many cases no adjustment at the low frequency end is provided. The high frequency stations can be made to track with the dial by adjusting the oscillator trimmer and peaking the aerial trimmer for maximum output.

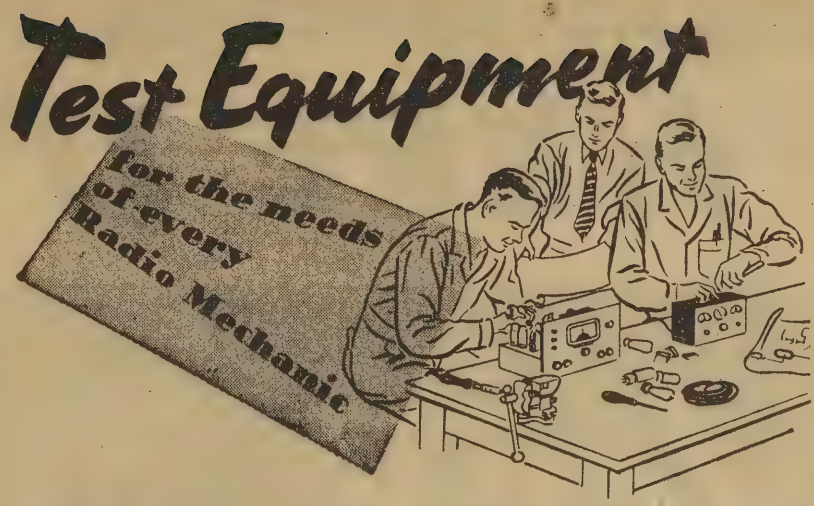
We told the story of alignment in greater detail in the July, 1946, issue, but the foregoing paragraphs give the essential information in brief form.

After that, you can fit your new "Advance" into an appropriate cabinet and rely upon it to bring you all the entertainment you want for many years to come.

Electronic Metal Analyser

RAPID and completely automatic analysis of a metal alloy is possible with a new direct-reading spectrometer. Spectrum lines are isolated and their intensity measured with electron multiplier phototubes. Output of each tube charges a capacitor, which at proper time discharges into a meter reading directly in percentage concentration of component being measured. Accuracy is high because no photographic equipment is used and variation in film emulsions is no factor.

Developed by Baird Associates, unit occupies 5 x 12 x 5ft., but largest component of the analyser goes through a 30in. door.



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- Palec VCT — (AC/DC Valve and Circuit Tester).
- Palec MCA—Multimeter AC/DC
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- F2/15 2" Round 0.1 M/A Universal Scale
- F5/46 5" Round Universal Scale
- F5 5" Round Universal Scale

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- Model 231 3" Round 0.1MA.
- Model 501 4" Square Universal Scale.

RADIO TEST EQUIPMENT

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- University TST/V AC/DC Vibrator Circuit Tester.
- University TST/V AC/DC Vibrator Circuit Tester
- University JOB Battery Operated Modulated Oscillator.
- University MVA AC/DC Multimeter in carrying case.
- University EVA Electronic Volt-Ohm M/A meter.
- University MK1 AC/DC Multimeter Kit build it yourself)
- University DS AC/DC Multimeter (5 ranges)
- University SOA AC Modulated Oscillator

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- 0.1 M.A. D.C. or UNIVERSAL TYPES
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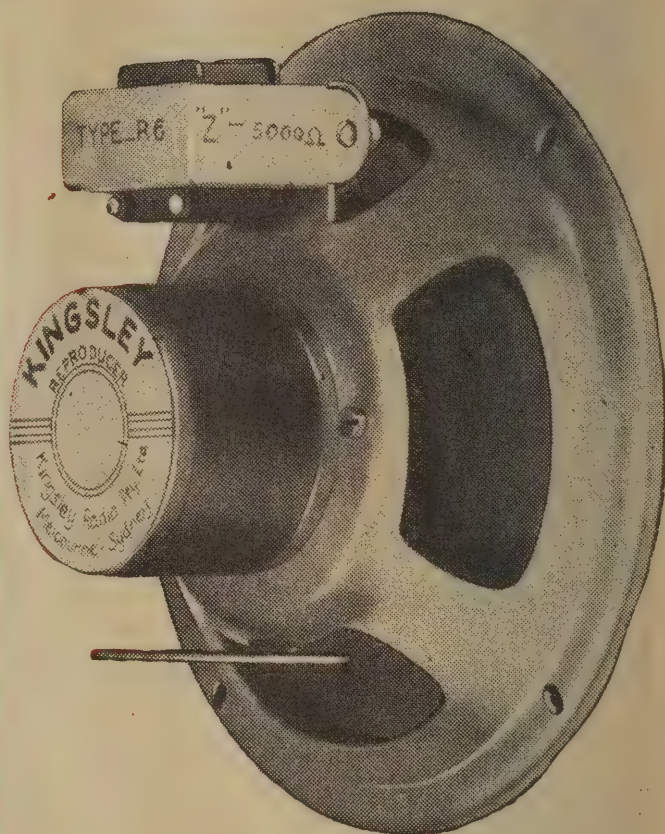
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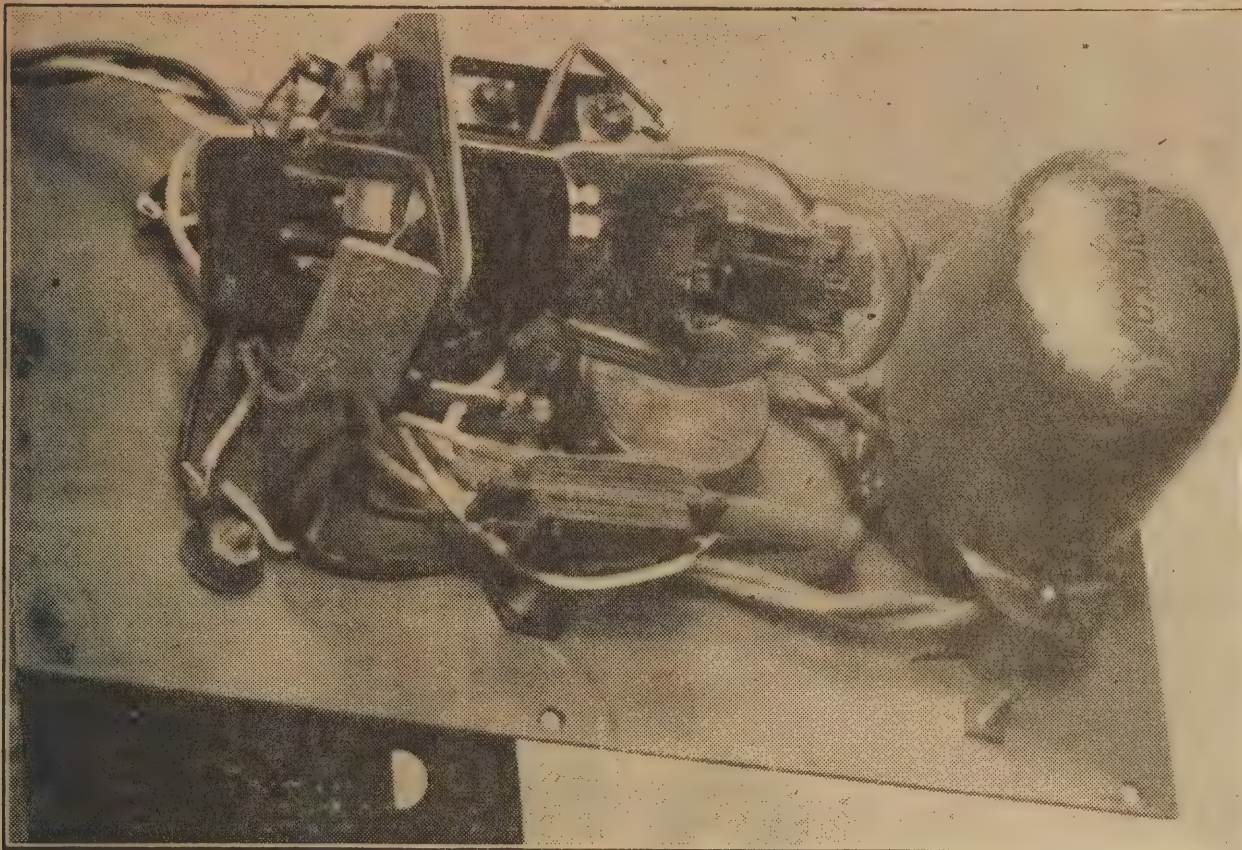


KINGSLEY RADIO

KINGSLEY RADIO PTY. LTD.

380 St. Kilda Road, Melbourne, Victoria . Phones: MX 1159, MX 3653

A CLOSE-UP OF THE OSCILLATOR CONSTRUCTION



Irrespective of the exact size of your version, construction should be very similar to that shown above.

where the oscillator ceases to operate. At the other extreme a very large value produces high amplitude and severe distortion.

R2 is simply a limiting resistor which prevents the frequency control potentiometer R1 from being turned to the limit where oscillation ceases altogether. The most suitable value can be determined experimentally after the instrument is put into operation.

DEGENERATIVE FEEDBACK

Resistor R3 in the cathode circuit introduces a degenerative effect which tends to give a reduced but more consistent output voltage and produces a marked improvement in the wave form. Once again, this value can be selected experimentally for best results, but .02 megohm appears to be a good all-round value.

The high-tension supply voltage is not at all critical but something around 250 volts is probably the best choice. Current is likely to vary between 2 and about 5 milliamps, depending on the actual valve used, the supply voltage and the amplitude of oscillation.

Under these conditions and using a loudspeaker transformer between 12 and 80 volts of audio were available from either half of the primary winding and between about .4 and 2.5 volts from the secondary. It is desirable to derive the output voltage from the secondary to avoid undue loading effect on the transformer. The voltage is

quite suitable for feeding into an amplifier or modulator at about pickup level.

TRANSFORMERS

If no suitable output transformer is available for the job, it would be quite feasible to press into service a small class B transformer, or any other similar unit of the type so readily obtainable from disposals equipment. Essentially, all that is necessary is a small transformer with one centre-tap winding, and it is actually an advantage if the inductance is not too high. If the ratio of the tapped winding to the output is nearer unity, it would be desirable to increase the potentiometer to 0.5 or even 1.0 meg to avoid loading effects. The same remark would apply if the potentiometer were to be connected across half the primary.

In adjusting the oscillator it is obviously facilitated if a simple CRO is available for inspection of the wave form. Failing that, the adjustments will have to be carried out by aural test, a sinoidal wave form being characterised by its liquid-like quality.

THE VALVE

The valve used in the original was actually an old 37, but almost any triode or triode-connected pentode can be pressed into service. In the normal way, the high-tension and heater supply can be drawn from the modulator or CRO with which the instrument is associated.

The oscillator is not suggested as a laboratory instrument, but it does provide a handy source of audio with less complication than most other devices.

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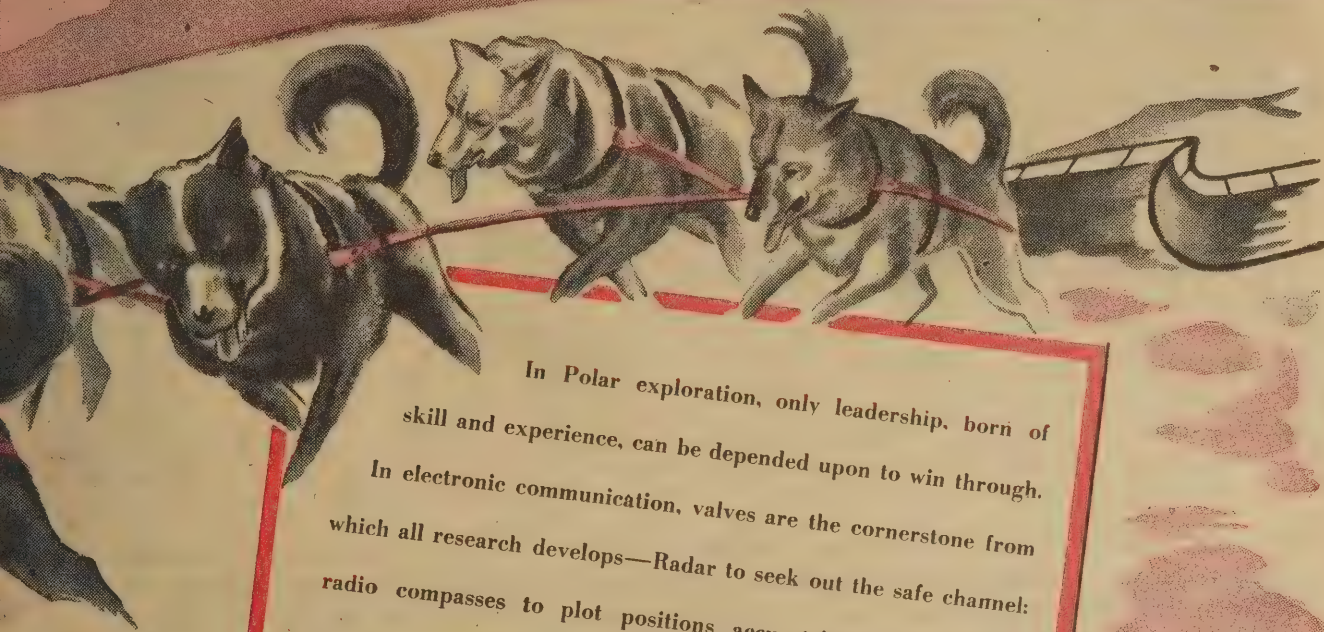
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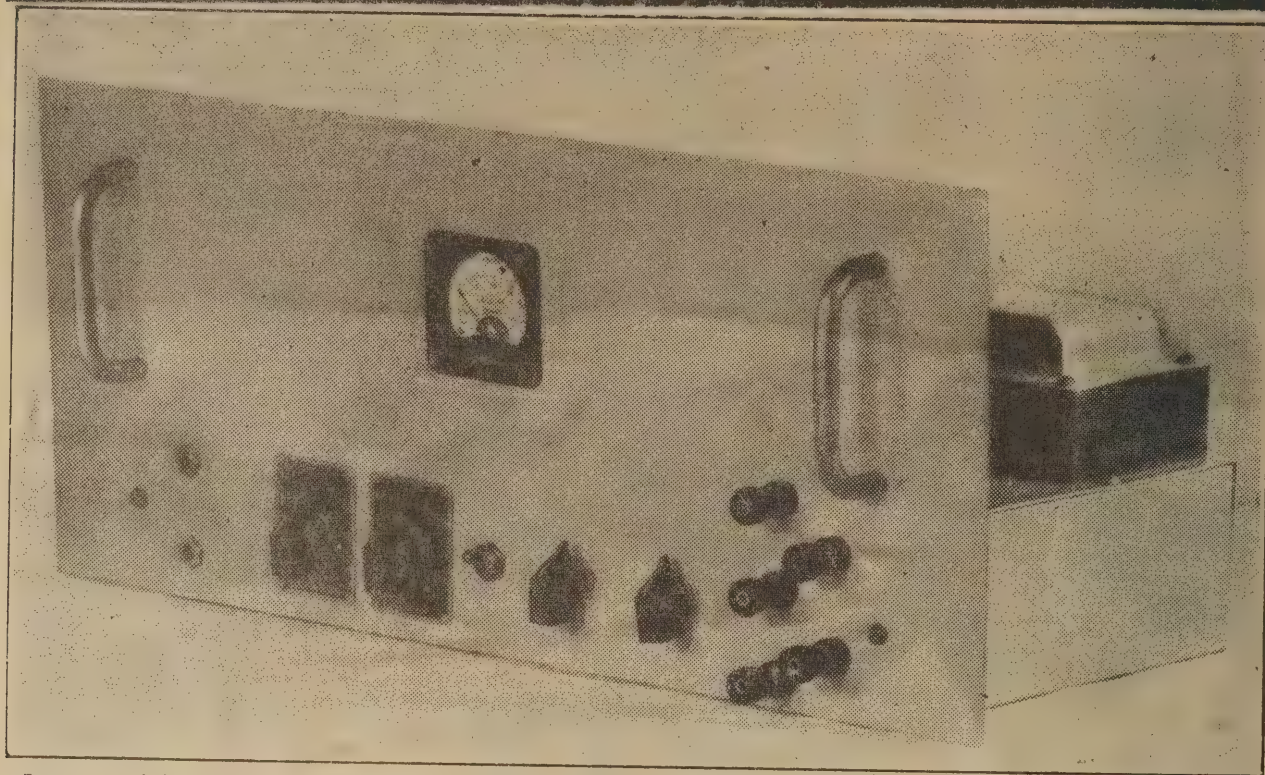


In Polar exploration, only leadership, born of skill and experience, can be depended upon to win through. In electronic communication, valves are the cornerstone from which all research develops—Radar to seek out the safe channel; radio compasses to plot positions accurately; echo sounders to gauge ocean depths, and constant communication with bases to keep informed. In all these devices, Radiotron Valves provide the pulse beat, facilitating the work of pioneers and improving radio in all its applications.



PTY. LTD.

AN AMPLIFIER FOR HOME RECORDING



Front view of the amplifier which was fitted up for rack and panel mounting. Microphone and pickup jacks are to the left, then the two gain controls, stand-by switch, treble boost control and bass switch. The output terminals are on the right.

At the request of many readers, we designed this amplifier especially for home recording purposes. Though not unduly complicated in design it features a high gain microphone amplifier, mixing facilities for two channels and circuits to allow compensation for losses in recording. Add to that its possible use as a gramophone amplifier or for low power P.A. work and you have a very useful piece of equipment.

THERE is always a limited but steady interest in home recording—or, should we say, recording on an amateur basis, as distinct from the work carried out by professional studios. Fond parents, who can afford the luxury, like to keep a record of their growing family. Or it may be an interest in Mary's talent as a violinist, or Johnny's efforts on the piano.

Yet, again, amateur recording finds application in voice production, language study, Morse practice, and in a variety of similar activities.

MANY USES

Our own interest in the subject arose from the desire to record transmissions using different microphone and modulator arrangements from stations VK2JU and VK2XV. While so engaged, we were able to record quite a few other experimental transmissions to allow the operators concerned to hear their voices as others heard them.

Another angle on the subject is that at least one medium-priced recorder is now available on the Australian market, which, though not competing

with higher-priced equipment, is still capable of making a very good disc. Two or three manufacturers have already released luxury receivers with recording facilities, similar to those which have been available for quite a while in the United States.

Last, but not least, there is the possibility of experimenters making up

recording equipment costs about as much to buy as a family car.

AMPLIFIERS

Just how you tackle the job of recording—or, indeed, whether you tackle it at all—is a matter for yourself. Our task was to design an amplifier which would do a good job without being unduly expensive to build.

Professional studios generally use push-pull recording amplifiers in order to achieve the lowest possible hum level and the smallest harmonic content. The power required seldom exceeds a couple of watts at full amplitude, so that such an amplifier is just loafing along. It usually has a multiplicity of input channels and faders, a level indicator, and full frequency compensation. In fact, the chances are that the treble control will be mechanically coupled to the recording mechanism to give automatic compensation as the stylus travels from inside to outside of the disc, or vice versa.

All this adds up to a lot of equipment—and it is indeed a very good thing when the job is tackled on a professional basis. The more complete

by **W. N.**
Williams

their own equipment from a combination of commercial and makeshift material. We know from experience just how many difficulties have to be overcome, but it is not an impossible task. Results can be obtained with such gear, although not with the fidelity and consistency of commercial transcriptions. This is hardly to be wondered at, considering that studio type

MAXWELL'S RADIO

4 VALVE MINIATURE PORTABLE

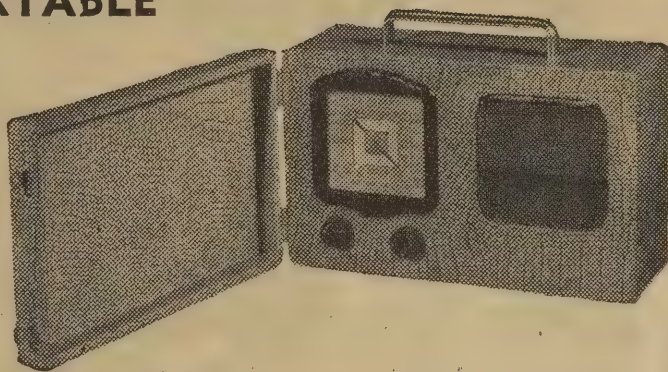
This set incorporates 4 Miniature Valves, Miniature Coils, Condensers, 2-Gang Etc., also Mini-Max Batteries.

The set is equipped with a 5" Speaker Rola make, and the Cabinet is finished in neat leatherette with smart chrome handle. The added advantage of the closed front presents a neat finished appearance.

The tested circuit supplied is easy to follow and there is ample instructional data. Should you desire it, we will assemble the main components ready for wiring.

SPRING-TIME PORTABLE CABINETS to suit Mini-Max Batteries. Size: 12½" high x 8½" x 5½".

Price 45/6; Chassis to suit 7/6.



Actual Size 9¼" x 4¼" x 6"

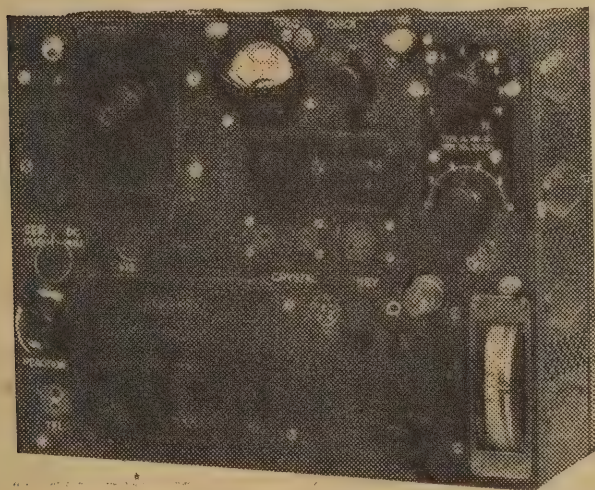
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1000 ohms per volt, 100 ohms internal
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PORTABLE WIRELESS SET TYPE A MK3



FEATURES: This set is brand new, complete with Vibrator Unit and Box of Spares which includes a spare set of Valves, Terminals, etc. The equipment is housed in a metal carrying case. Vibrator Unit.

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The set is a combined TRANSMITTER, RECEIVING UNIT. Weighs 8lbs. 4 ozs. Set complete excepting the Crystal.

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POWER SUPPLY: 6 Volt Accumulator.

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Will weld iron, steel, tin, copper, bronze, etc.

Welds up to 1/16" metal on twelve volts.

Current consumption 12 to 18 amps. Not suitable for mains use.

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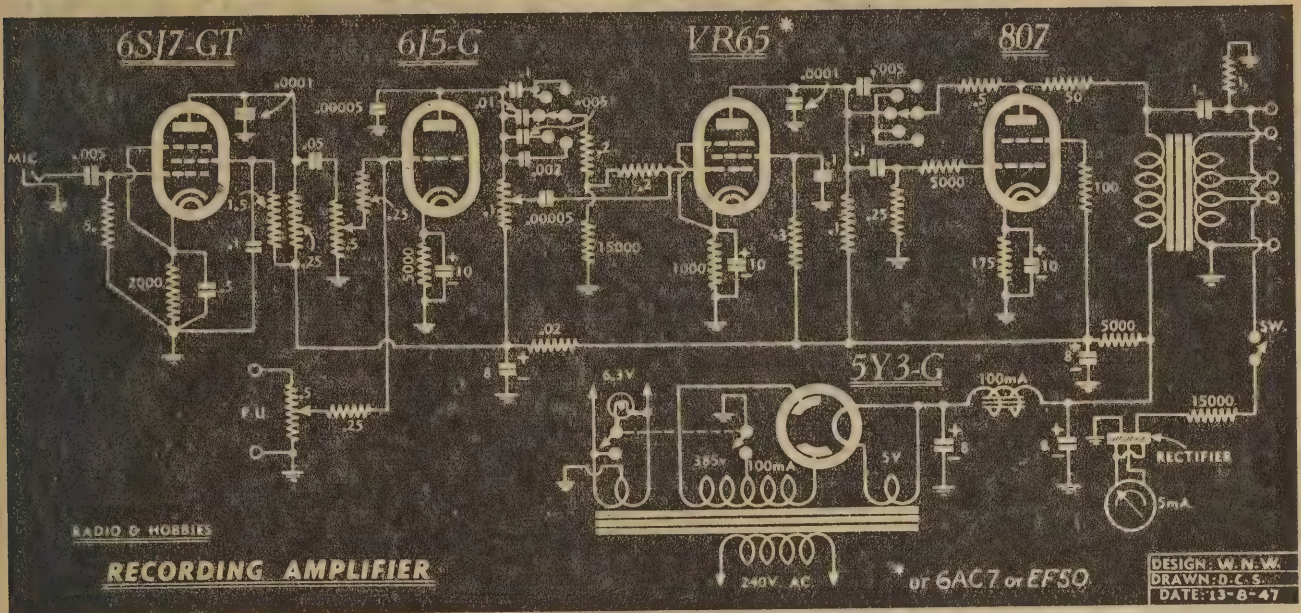
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NEW STANDARD RADIO

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CIRCUIT OF THE HOME RECORDING AMPLIFIER



Here is the complete circuit diagram. We suggest a VR65, 6AC7 or EF50 to drive the 807, but a 6J7-G or 6SJ7 could be employed with some reduction in overall gain. The resistor in series with the level indicator should be adjusted to give adequate deflection without unduly loading the output circuit.

and foolproof the recording system, the better will be the resultant discs and the fewer the number of rejects. And reject discs, repeat recordings, or unsatisfactory results, are bad for business.

OUTPUT STAGE

Scaling down these requirements for amateur use, there is really no need for a push-pull output system, with its attendant complications of extra valves and a push-pull signal source. A single output valve, like the 807, can deliver ample power for the job, while negative feedback will take care of harmonic distortion and output impedance.

This latter point is quite important in a recording amplifier, owing to the wide variations of impedance against frequency in a typical cutting head. The problem of obtaining level frequency response is usually much simplified if the cutter is fed from an

amplifier having a low output impedance.

Sufficient gain is necessary in the amplifier to allow full output to be obtained, using either a microphone, or signals from a radio set or pickup. This signifies the need for a voltage amplifier, and also a microphone pre-amplifier stage, assuming that a high quality, low output type of microphone is to be used.

Then there is the matter of frequency compensation. When recording near the centre of a disc, the groove speed is relatively slow and the higher frequencies tend to record and reproduce poorly, giving very "woolly" reproduction. Unless one is prepared to tolerate this, the only alternative is to provide a system of variable treble boost, which can be adjusted to compensate for this progressive change in treble response with groove diameter. If one has any ideas of recording at 33 rpm, the matter of treble boost becomes even more important.

TREBLE BOOST

It is essential to provide this treble boost without increasing the distortion content of the amplifier, so that schemes which rely on shorting out the feedback network are generally to be avoided. The only alternative, assuming that a reasonable amount of boost is to be available, is a special treble boost stage.

At the other end of the spectrum, it is necessary to consider a method of bass attenuation to give an approximate cut of six decibels per octave below about 250 c/s. This is sometimes taken care of by the natural characteristics of the recording head or in the coupling network.

Even if it has to be provided in the amplifier, there is no particular difficulty, since the cut can be produced by the simple expedient of inserting a selected low value of coupling condenser between two stages. There is no need for the bass adjustment to be continuously variable, and the compensation can be switched in or out

PARTS LIST

- 1. panel 19 x 8½.
- 1. chassis 17 x 8½ x 3.
- 1. power transformer, 385V., ct. 285V. at 100mA., 6.3 at 3A., 5V. at 2A.
- 1. filter choke, 100mA.
- 1. output transformer (see text).
- 1. moving coil meter (1—5mA).

RESISTORS

- 1 5 meg., 1 1.5 meg., 1 1.0 meg., 1 .5 meg.
- 1 .3 meg., 4 .25 meg., 2 .2 meg.
- 1 .1 meg., 1 20,000 ohm, 2 15,000 ohm, 2 5000 ohm.

- 1 2000 ohm, 1 1000 ohm, 1 100 ohm, 1 5000 ohm, 5W, WW, 1 175 ohm 5W, WW, 1 50 ohm, 5W, WW.

- 2 .5 meg. potentiometer, 1 .1 meg. potentiometer.

CONDENSERS

- 3 10 mfd. electrolytics 40 PV, 1 8 mfd. electrolytics 600 PV, 3 8 mfd. electrolytics 525 PV.
- 1 1 mfd. tubular 600 PV, 1 .5 mfd. tubular.
- 4 .1 mfd. tubular, 1 .05 mfd. tubular, 1 .01 mfd. mica, 3 .005 mfd. mica, 1 .002 mfd. mica.
- 2 .0001 mfd. mica, 2 .00005 mfd. mica.

SOCKETS

- 3 octal, 1 5-pin, 1 English octal or alternative.

VALVES

- 1 6SJ7-GT, 1 6J5-G, 1 VR65 (or similar)
- 1 807, 1 5Y3-G.

SUNDRIES

- 5 terminals, 4 knobs, 1 off-on switch.
- 1 5 x 2 rotary switch, 1 copper-oxide rectifier (see text).
- 1 resistor strip, 2 phone jacks, power cord, shielded wire, hook-up wire, nuts & bolts, etc.

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SIZE $6\frac{1}{4}'' \times 4\frac{3}{8}'' \times 4\frac{5}{8}''$
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WEIGHT—Including Batteries—
 $3\frac{3}{4}$ lbs.

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INCLUDES CABINET,
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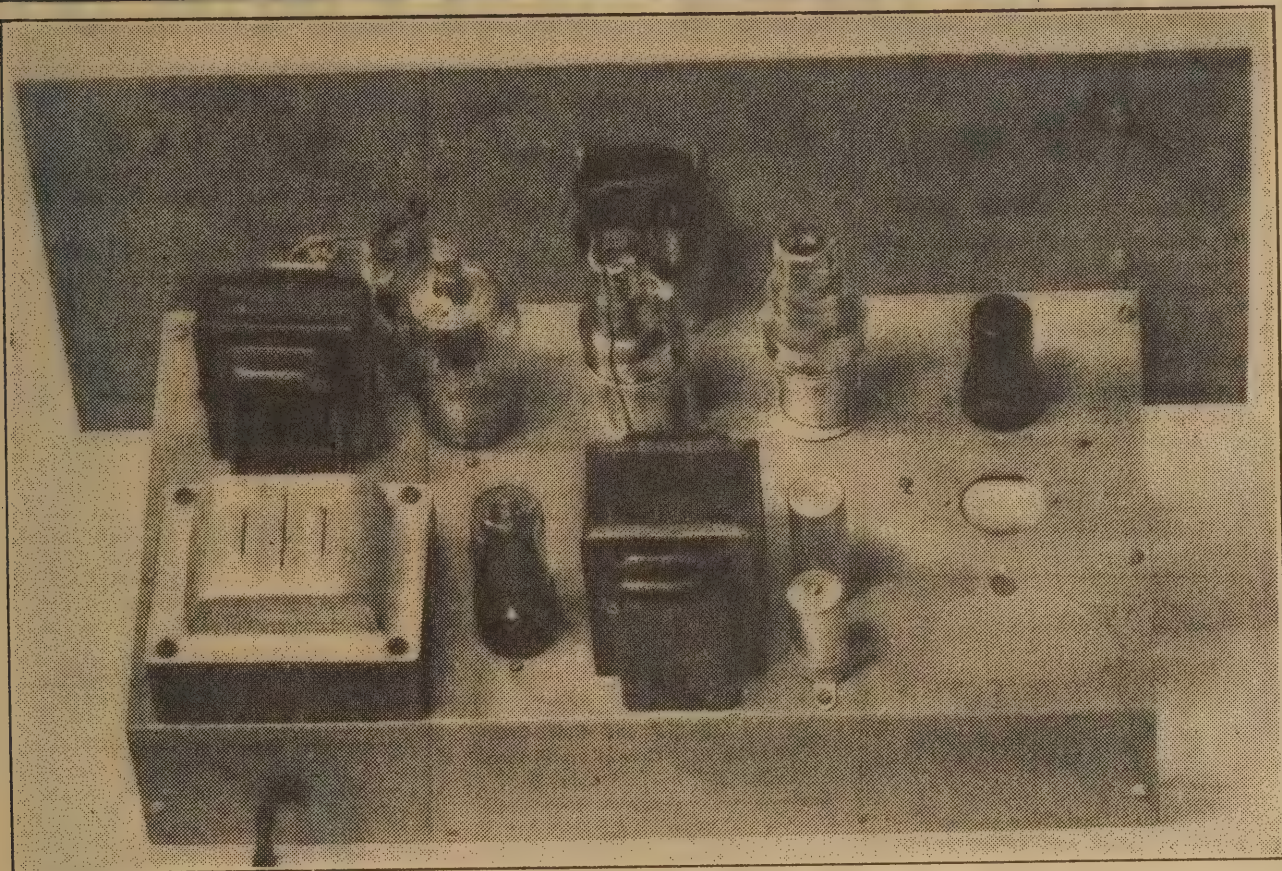
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Includes Cabinet, Chassis,
Coils, I.F.'s Valves, Batteries,
Gang and all necessary parts to finish set.

AVAILABLE EITHER AS A FOUNDATION OR COMPLETE KIT

LAYOUT OF THE AMPLIFIER FROM THE REAR



A rear view of the amplifier. We found it necessary to shield the grid cap of the VR 65 to prevent regenerative effects from the plate cap of the 807.

of circuit, depending on whether the amplifier is being used for recording or playback.

Summing up these requirements, it follows that five valves will normally be necessary—a microphone pre-amplifier, a frequency compensating stage, voltage amplifier, power valve, and rectifier.

LEVEL INDICATOR

A final point is the desirability for some form of level indicator. We used a small five-milliampmeter movement from some disposals equipment, with a metal rectifier from the same source. With this meter in use, it is easy to maintain the correct level for recording at all times.

Reviewing the circuit in detail, the power supply uses a standard 385-volt, 100 milliamp power transformer, and a single section filter to supply the plate of the 807. A 5000 ohm resistor and 8 mfd. bypass drops the voltage for the screen of the 807 and the other valves, and provides additional filtering as well.

Under these conditions, the 807 operates with about 325 volts between plate and cathode, and an effective screen voltage of about 270. With self-bias, one can expect a power output of from 7 to 10 watts into a 3000 to 4000 ohm load. Total cathode current will approximate 80 milliamps.

To handle this power we used a com-

mercial output transformer, feeding the various tappings to terminals on the front panel of the amplifier. The highest impedance terminal actually connects through a 1 mfd. 600-volt condenser to the 807 plate. This is for feeding directly into a high impedance cutting head—either commercial or home made. The 1.0 megohm resistor, by the way, is there simply to maintain the output side of the condenser at earth potential as far as D.C. is concerned.

SPEAKER TAPPINGS

The other tappings were for loud-speaker output at 2.3, 8, and 12 ohms, all of which happened to suit our purpose. By the time this article appears in print, you should be able to buy a transformer with a 500 ohm and a 2.3 ohm secondary winding, which will cater for a high impedance or a 500 ohm cutting head, or one wound with heavy wire to operate

from a voice coil winding. At least one low impedance winding is desirable, anyway, for connection of a monitor speaker.

In this regard, it is handy to note that the monitor speaker voice coil can be connected to the 2.3 ohm winding through a series rheostat, allowing the monitor to operate at any convenient low level, irrespective of how much power you have to feed into the cutting head. Of course, if the recording microphone is in the same room as the equipment, it is undesirable to have the speaker and microphone in operation at the one time. In fact, it may be impossible because of acoustic feedback.

There is room for experiment here. If you only need to record at a relatively low power output, a smaller resistor can be selected to give a larger swing for the necessary recording level.

METER CIRCUIT

To avoid loading the output valve unnecessarily or operating the meter to no purpose, it is a good scheme to install a switch to bring the meter into circuit only when actually making a recording. Or you may prefer, alternatively, to switch it to read high tension volts.

As previously mentioned, the signal level meter is a 5 milliamp movement from some disposals equipment. When

WATCH out for more articles on recording. We plan to outline the requirements and the difficulties for those who may have ideas of constructing their own equipment. At the other end of the scale, an experienced contributor will present data and information from the point of view of one who has operated a small recording studio as a commercial venture.

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Gent's renovated Pocket watches, nickel and rolled gold—7 and 15-jewels. Fully guaranteed. **£2/10/-**
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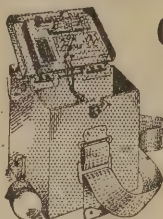
Postage 1/- extra.



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Push-type grease guns, ex-Army. 5oz. Slightly used; perfect order. 12/6 each. 10oz., slightly used; perfect order, 15/- each. 10oz. new, £1 each.

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Genuine P.M.G.

Morse

Key, with Light

Complete with Steel Carrying Box, 8in. x 8 1/2 x 7. Worth at least £6/10/-. With carrying strap.

Our Price 11/6

The Carrying Case, which is complete with shoulder strap, alone is worth the money. Together with spotlight 29/-. Freight 4/- (NSW); Interstate F.O.R.



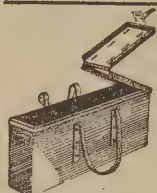
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Our Price 17/6

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METAL TOOL BOX,

3/11 ea.

3 1/2 wide, 7in. deep, 15in. long. Ideal for carrying spanners, pliers, hammers, etc. Opens at top and has leather grip handle. Cost the Army 15/- each. Brand new. Out they go for 3/11 each. Post, N.S.W., 2/- extra; Interstate 3/6 extra.

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300 degrees Fahrenheit

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Only £2/19/6 ea.

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Our Offer this time includes Spanners that have been unprocurable for the past seven years.

S.A.E. MAGNETO SET SPANNERS.—

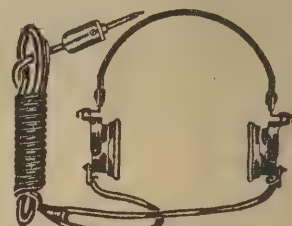
One 9/32 x 5/16; One 11/32 x 3/8; One 13/16 x 15/64; One 1/2 x 7/32; One 11/32 x 3/8; One 7/16 x 1/2; One D.B.A.; One I.B.A.; One 2.B.A. x 3.B.A.; One 2.B.A. x 4.B.A.; One 4.B.A. x 5.B.A.; One 6.B.A. x 7.B.A.; One 8.B.A. x 9.B.A.

RING AND OPEN END SPANNER—

WHITWORTH.—One 7/16, ring and open end, one 1/2, ring and open end, one 9/16, ring and open end, one 5/8, ring and open end. CHROME RING SPANNER, WHIT.—5/16 x 1/4, 1 set SPANNER, 19/32 x 11/16, S.A.E., 1 Petrol Pipe Flaring Tool, 1 2-lb. Ball Pein Hammer; 1 Tool Box, 3 1/2 in. x 7 in. deep x 15 in. long.

The Lot for £4/7/6

Freight 7/6 extra.



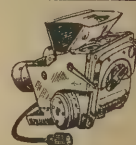
HEADPHONES

Brand new, S.T.C. and Stromberg-Carlson. We have just made another purchase of the brand new 'phones, complete with cord and plug, and we are now able to sell them at the ridiculously low figure of—130 ohms impedance .. **9/6**

2000 ohms impedance .. **£1**

PLEASE NOTE: These 'phones are brand new, ex-Army, and not military rejects.

BOMB-SIGHTS



Ex-Air Force. Useful component parts include 24v. motor. Best quality lenses, globes, sockets, etc. Cost £100.

Now .. **£2/17/6**

Postage 3/6 extra.

No C.O.D.



we opened it up for cleaning and inspection we found that it had a built-in multiplier to make it read 0-20 volts d-c. This was shorted out to give access directly to the 5 milliamp coil.

The rectifier happened to be a 50 milliamp telephone relay type, which we bought for a couple of shillings. This was connected to the 807-plate circuit and the output taken through a series resistor to the meter movement. The series resistor was adjusted to give full-scale deflection for maximum amplifier output, the value being about 5000 ohms in our case.

So much then for the metering. Because of the amount of equipment likely to be tied to the plate circuit of the 807, we took unusual precautions against instability, by inserting stopping resistors in series with grid, plate and screen. Next matter was the choice of a voltage amplifier valve.

VALVE TYPES

Once again from Disposals sources, we have accumulated a number of 6AC7, EF50, and VR65 valves, which are similar high slope R.F. pentodes, with a transconductance around the 8000 mark. Since we wanted as much gain as practicable, we checked on the use of these tubes, and found them to be quite useful. Under the conditions shown, the gain is higher than that available from a 6J7-G or similar pentode. Therefore, despite the use of appreciable negative feedback and a mixing circuit, an input to the pickup terminals of less than 0.25 volt at middle frequencies, is adequate to give full output from the amplifier.

High slope valves of one type or the other are fairly plentiful and cheap at the moment, and we feel quite safe in recommending their use. However, apart from some reduction in overall gain, there is no objection to using either a 6SJ7 or a 6J7-G. In this case the cathode resistor would be increased to 2000 ohms, the screen resistor to 1.5 megohms, and the plate resistor to 0.25 megohm.

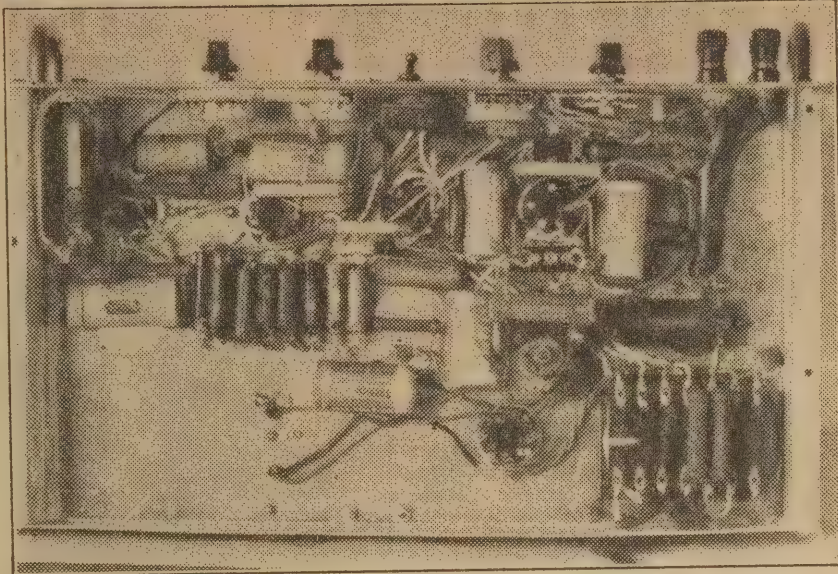
For the tone control stage we considered the use of the same general arrangement as we have used in some previous amplifiers. However, we decided against such a course for reasons of simplicity and also to afford readers the chance of using up any odd triode which may be available. The 6J5-G was the one used in the original amplifier, but almost any other triode would do, or a triode-connected 6J7-G.

HIGH NOTE BOOST

The plate of the valve is fed through a 0.1 megohm potentiometer, with a coupling network to three resistors in the following grid circuit. These three resistors feed only about 1-15th of the audio voltage to the following grid, so that the overall gain of the triode stage approximates unity in the middle register.

However, a small condenser between the tapping on the potentiometer and the following grid passes the higher frequencies straight through to the grid and makes available practically the full gain of the triode stage in

AMPLIFIER WIRING FROM BELOW



Most of the components are mounted on insulated panels, although some may be mounted directly from point to point.

the upper register. Adjustment of the potentiometer allows as much of this treble boost as necessary to be utilised, or affords a small degree of treble cut in the other extreme position.

Bass attenuation is achieved by switching various values of coupling condenser into circuit. We used a single bank 2 x 5 switch for the purpose, and wired the second set of contacts to provide bass boost in one position. In this initial position, a condenser is cut in series with the feedback network around the 807 and, at the same time, the full coupling condenser value is in circuit between the 6J5-G and the following amplifier valve. This would be the position normally used for playback of commercial discs.

BASS BOOST

Where bass boost is not required, the series condenser is removed from the feedback network, and the normal coupling value employed from the plate of the 6J5-G. The other three positions progressively reduce the bass response, allowing one to match the characteristics of the amplifier to the requirements of the cutting head in this respect.

If you want to simplify this scheme to an irreducible minimum, the 2 x 5 switch can be replaced by a single pole off-on switch.

You would then select by experiment the small value of coupling condenser necessary to give the desired

recording characteristic and wire this permanently into circuit. For playback, a larger condenser—say 0.1 mfd.—would be switched in parallel with it. The feedback resistor in the 807 plate circuit would be wired in without the series condenser, thus obviating the bass boost feature on playback.

However, it is handy to be able to vary the bass response a little, as the combination of a deep voice and certain types of microphone tend to produce an unnaturally heavy recording, with chest and throat noises very prominent. Commercial studios often "doctor" the response of recordings to counter this effect, and the possible tendency for some people inadvertently to lower the pitch of their voice when using a microphone. However, we are in danger of getting into deep water.

INPUT MIXING

The grid circuit of the 6J5-G has a simple mixing system for the input from pickup control and microphone amplifier stage. An interesting point arose in connection with the choice of values here.

We noticed a severe treble loss in the amplifier while taking frequency tests and at first blamed the output transformer. However, more careful investigation revealed that the trouble was actually in the grid circuit of the 6J5-G, and the reason was soon apparent. A little calculation shows that the input capacitance to this stage, including "Miller" effect, valve capacitance, and circuit strays, amounts to 40 mmfd. or more, and this is effective as a by-pass at the grid end of the series isolating resistors.

We wanted to retain the mixer circuit, so reduced the series resistors from 0.5 to 0.25 megohm, and this was

(Continued on Page 83)

ARE you interested in home recording?

If so we would like to know your reactions and experiences. Some of you we know have built your own equipment, including wire recorders. Please write to us about your gear, as your letters will be a great help when preparing further articles.

COMPLETING YOUR 1K5-G RECEIVER

WITH a regenerative detector and two pentode audio stages, the "1K5-Three," described last month, has just about as much audio gain as can comfortably be utilised in a receiver of this type. Any further increase in audio gain would make the set unstable in operation, tending to produce howling effects at the slightest provocation. Or, by way of variation, the instability may be evident as a regular "popping" sound which is affectionately known among radio technicians as "motor-boating."

Yet another problem introduced by excessive audio gain is that of microphony—or the tendency for the receiver to produce ringing noises when bumped or tapped.

For these reasons any addition to a set like the 1K5-Three must be made ahead of the detector, the amplification being effective at radio rather than audio frequencies.

THE R.F. STAGE

Unfortunately, perhaps, the addition of an RF amplifier stage necessitates the use of an additional tuned circuit involving a coil and variable condenser. It is actually possible to use a form of impedance coupling and an untuned RF stage but the amount of gain available with ordinary valves is so low that the value of the stage becomes problematical.

In the early days of TRF receivers the tuning for such additional stages was controlled by a separate dial and, in fact, there was a dial for each RF stage and one for the detector tuning. Since each dial had to be separately adjusted when tuning from one station to the next, it is little wonder that set-owners in those days made use of cards to record the numerical setting of the tuning dials for their favorite stations.

The complication of multiple tuning



Front view of the completed receiver.

In this issue we describe the final step in the construction of the "1K5" receiver—namely the addition of an RF amplifier stage. With the valve in position, the set is exactly as the original "1K5-Four" receiver, described in the May issue.

dials can be avoided by using ganged tuning condensers controlled by a single dial. However, it is fairly obvious that such a scheme will only work effectively if the coils and the tuning gang sections are carefully matched so that, once adjusted, they remain perfectly in step right across the tuning range of the receiver.

The initial adjustment is provided by small "trimmer" condensers connected in parallel with each section of the tuning gang. These are adjusted to peak the signals at the high frequency end of the band and it is usually assumed that the inductance of the coils will be sufficiently well matched to ensure good tracking at the low frequency end.

Therefore, when purchasing the aerial coil for your "1K5-Four," make sure that it is of the same brand and same general type as the RF coil with reaction already installed. Some coils have variable iron cores which permit adjustment of the inductance for tracking at the low frequency end of the band, but we will make further mention of this later in the article.

FINAL MODIFICATION

Let us assume, then, that you are ready to go ahead with the addition of the RF stage to your "1K5-Three" receiver.

First of all install the aerial coil in the appropriate position near the aerial terminal, bringing the lead from the grid lug up through a hole in the top of the can for connection to the stator plates in the rear section of the

PARTS LIST

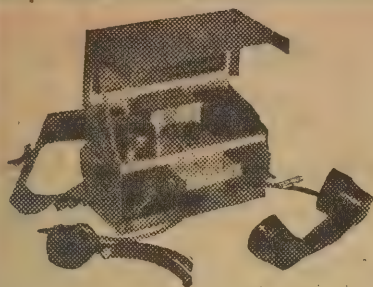
Here are the parts you already have in your three valve set:—

- 1 Chassis 10 x 6½ x 2½ in.
- 1 "H" Type two-gang condenser.
- 1 Tuning dial, (Efco type CD/17 or similar).
- 1 R.F. coil with reaction.
- 1 .0001 mfd. midjet reaction condenser.
- 1 .5 meg. potentiometer with switch.
- 2 Octal sockets, 1 6-pin, 1 4-pin.
- 1 R.F. choke.
- 1 .25 mfd. electrolytic condenser.
- 2 .1 mfd. tubular condensers.
- 2 .02 mfd. tubular condensers.
- 1 .001 mfd. mica condenser.
- 3 .0001 mfd. mica condensers.
- 1 Trimmer condenser (if not fitted to gang).
- 1 2 meg. resistor.
- 2 1 meg. resistors.
- 1 .75 meg. resistor.

- 1 .5 meg. resistor.
- 1 .25 meg. resistor.
- 1 .1 meg. resistor.
- 1 50,000 ohm. resistor.
- 3 1K5-G valves.
- 3 45 volt "B" batteries.
- 1 2-volt accumulator.
- 2 1.5 volt torch cells.
- Earphones, 2 terminals, 3 small grid clips, 6-pin battery plug, 4-pin speaker plug, 7 position resistor panel, short length shielded wire.

YOU WILL NEED THESE EXTRA PARTS:

- 1 1K5-G valve.
- 1 Valve shield.
- 1 Octal valve socket.
- 1 Aerial coil.
- 1 Trimmer condenser.
- 1 0.1 mfd. tubular condenser.
- 1 75,000 ohm. resistor.
- 1 Small grid clip.



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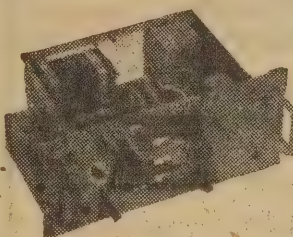
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0.350 THERMO COUPLE Mill/Amp. METERS

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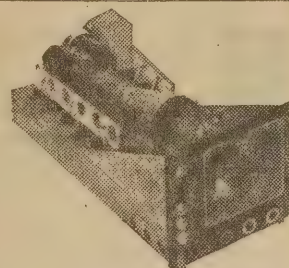
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Pointer, from 9d
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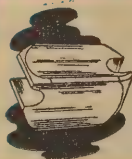
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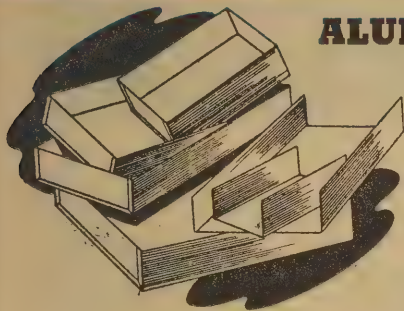
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J.V.R. Lubec, Vic.

I always look forward to getting your great "Colrad Technical Notes" and am very glad there is such a thing in Australia. It is always good to deal from a shop you can depend on. Thanking you.

R.S. Five Dock, Sydney.

Thank you again for the very useful literature you included in your letter and am looking forward to more of this data.

L.A.S. Naval W/T Station,

Canberra. A.C.T.

I find your Technical Notes and hints very helpful as I am a radio serviceman, and look forward to them every month. Thanking you.

K.G.B. Shepparton.

I should like to express my appreciation for the circulars and technical notes which I have received periodically; these are interesting and enlightening.

G.W.B. Lawson, N.S.W.

I thank you very much for the various literature and circuits forwarded to me from time to time.

S.H.B. Christmas Hills, Vic.

Further thanks for your price list, Technical Notes and interesting circuits sent along, all of which are very much appreciated.

H.W.B. Townsville.

I also wish to state my appreciation for the interesting articles, etc., which I have received

G.A.C. Eudlo, Qld.

Thanking you for your prompt and valuable service.

S.B. P.O. Narromine, N.S.W.

First of all I wish to thank you very much for the very interesting literature which you have sent from time to time.

J.R.B. Dookie Agricultural College

Vic.

Re your Techni al Notes on loop aerials, I must say this was just what I needed at the moment.

C.N.C. Clevedon, Woolloowin, Qld.

I also wish to thank you for Technical information supplied some weeks ago, re milliameters and voltmeters. The information was very helpful and I was enabled to build the apparatus from parts purchased from your store on a recent trip to Melbourne. Furthermore, I find your Technical Notes extremely interesting, particularly No. 3, which I received last week. Congratulations on a very excellent service.

W.G.C. Mosman, N.S.W.

Many thanks for your technical information which I receive regularly.

M.P. Petersham, N.S.W.

I must also thank you for the fine technical data I have been receiving lately and I am sure they will come in handy.

C.D. Solomon Town, S.A.

Thank you for the prompt attention given to my order.

D.G.M. Millicent, S.A.

Finally, I would like to commend you on your excellent service, both as regards speed and in respect to your circulars and circuits. I can assure you your organisation is greatly admired by us "down south," and your circulars are very eagerly awaited.

W.J.B. West Hobart.

I wish to thank you for quote re wireless parts which I received last Saturday, also thanks for the various circuits and other data you enclosed.

H.S.L. Stawell, Vic.

Thank you for your interest and help; I must say your service stands well above other firms I have contacted, and should reward you for your trouble.

E.D. Bundaberg, Qld.

Many thanks for all the goods I have received through your fast mail service; also circuits which I have received now and again

H.Mc. Dollar, Sth. Gippsland.

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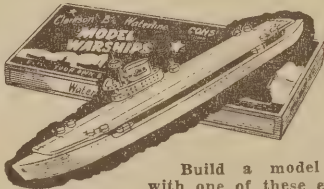
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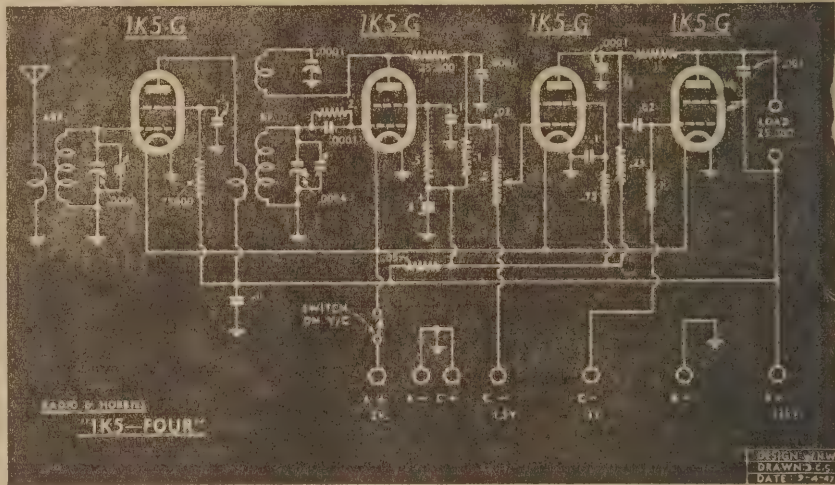
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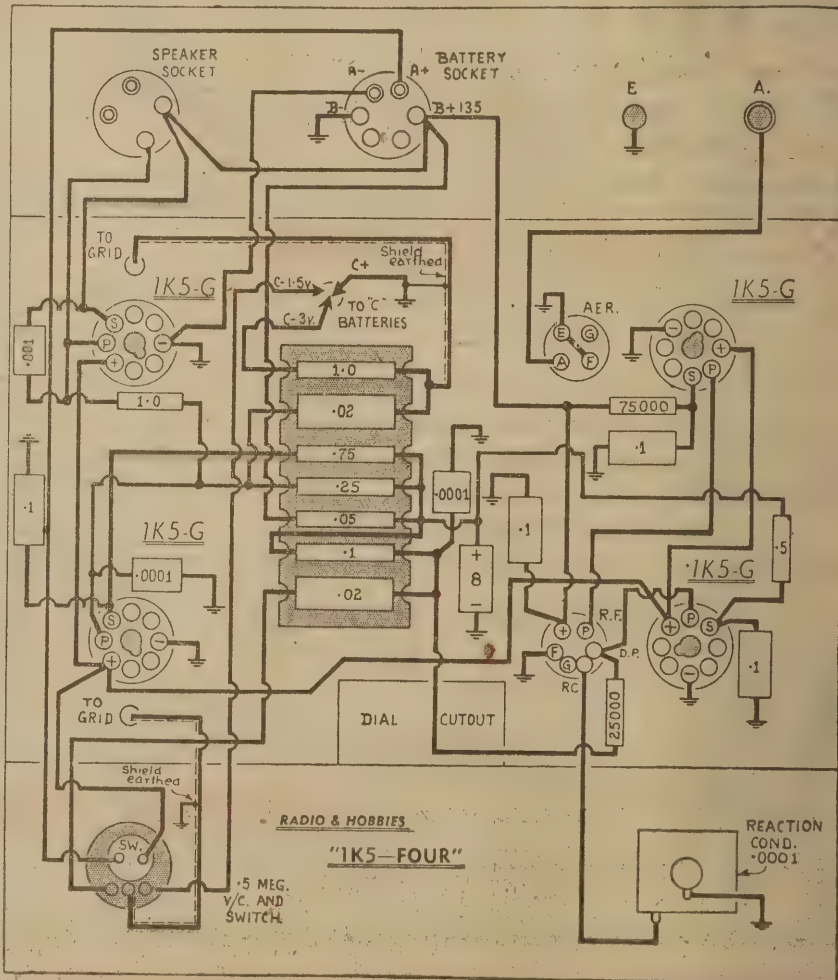
FINAL IK5-G FOUR CIRCUIT



The circuit diagram.

gang. A small trimmer condenser should now be soldered with one lug to the same stator plates and the other to the framework of the condenser. For ease of adjustment, see that the outer plate of the trimmer is connected to the framework.

The next step is to mount the octal valve socket in position, remembering to lock the valve shield base or contact device underneath the heads of the screws. You can also run a wire from the rear stator plates of the tuning condenser to a cap which fits on to



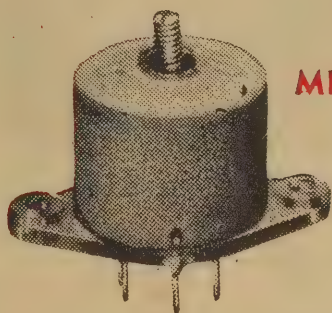
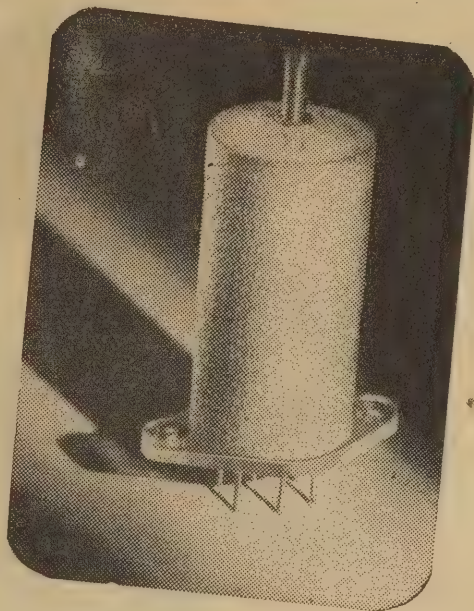
Showing final form of wiring.

new

Magnasonic *Iron Clad* Coil

for mantel and personal radios

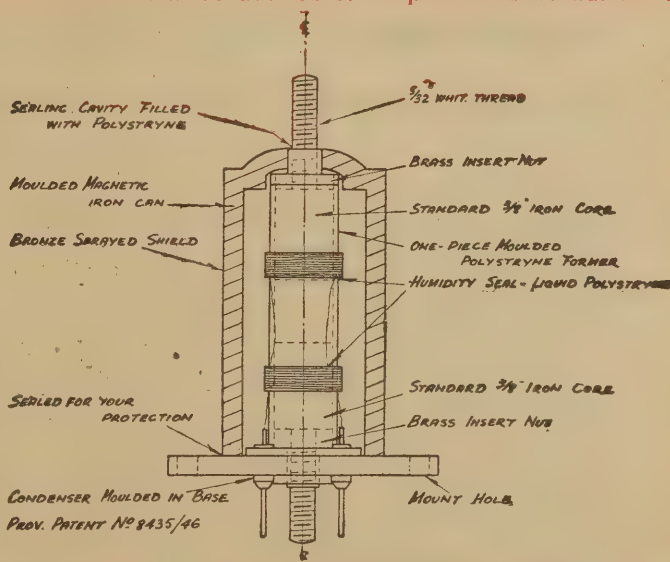
Radio set technicians and assemblers may now benefit by the very latest advances in coil design with the new R.C.S. Magnasonic coils. These coils have been specially designed for use in mantel, midget and personal radio. This has necessitated a coil unit which, whilst conforming to the space restrictions of these designs, is nevertheless a stable unit of high performance. The R.C.S. windings turned on a moulded polystyrene former are further shielded with the patented bronze sprayed iron can.



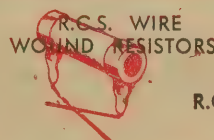
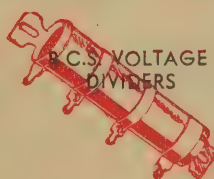
MIDGET COIL

This is the midget coil for personal radio. Both broadcast and short wave available. Reproduced actual size.

Here is a cross section of the new R.C.S. Magnasonic intermediate, with condensers moulded into the base. This is an R.C.S. patent and is one of the reasons of the performance superiority of R.C.S. intermediates.



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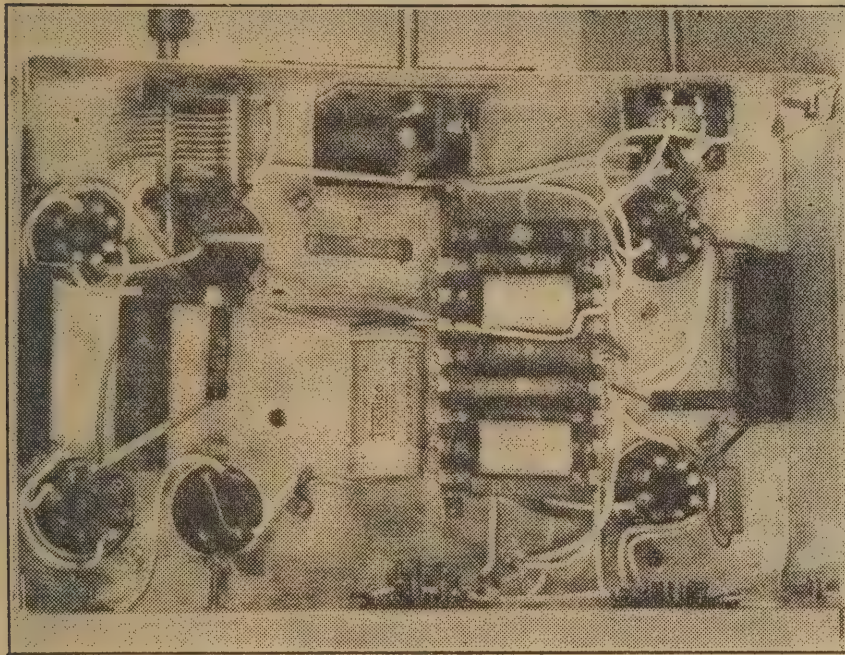
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UNDERCHASSIS VIEW OF SET



Placement of components under the chassis.

the grid cap of the 1K5-G RF amplifier.

Now turn the set upside down and proceed to wire up the new components.

Disconnect the aerial lead from the "P" terminal on the RF coil and connect it to the aerial lug on the aerial coil. Join the "F" or AVC lug on the aerial coil to the earth lug and connect to chassis. The lead from the grid lug already runs up through the can to the tuning condenser and the cap of the RF amplifier valve.

Now wire the filaments of the extra valve by connecting A- (pin 7) to chassis and A-plus (pin 2) to the corresponding pin on the detector socket.

The plate of the valve (pin 3) connects to the "P" lug on the RF coil which has previously been connected to the aerial terminal. The "B" lug on the same coil should be disconnected from chassis and a lead taken to the most convenient B-plus supply point.

SCREEN SUPPLY

To supply the screen of the 1K5 RF amplifier, connect a 70,000 ohm resistor (.07 meg) between the B-plus lug of the RF coil and pin 4 of the socket. The 0.1 mfd. screen bypass condenser fits between the screen pin and any convenient earth lug on the chassis.

In our original tests with the "IK5-Four" we found that best results were obtained if the RF choke in the detector plate circuit was replaced by a 25,000 ohm resistor. It is suggested, therefore, that you remove the RF choke at this stage and replace it with a 25,000 ohm resistor.

That completes the wiring of your "IK5-Four" and you can proceed to put the receiver into operation, after having carefully checked the new connections.

Switch on the set and tune to a weak

station around about the 1300 or 1400 kc. It is assumed that the trimmer on the detector tuning has already been set to make the stations come in at approximately the correct point on the dial. It remains, therefore, to adjust the trimmer on the RF section for maximum output.

Tune to a weak station, as already mentioned and, while rocking the dial slightly to keep the station accurately tuned, vary the adjustment of the RF trimmer condenser until the station is received at maximum strength. It is wise to choose a weak but steady signal for this adjustment, operating the reaction control just below the point of oscillation.

If your coils happen to be equipped with variable iron cores, tune to a station around about 600 kc and, with the reaction well advanced, try varying the position of the slug in the aerial coil for optimum results. After this, it is necessary to re-check the setting of the aerial trimmer on the high frequency station to compensate for any change in coil inductance.

Where variable iron slugs are not provided, it is simply necessary to peak the trimmers at the high frequency and leave it at that.

OPERATION

If the set is operating properly, you should notice immediately the improvement in gain provided by the RF stage. Selectivity should be boosted also, so that stations which may have been tunable with difficulty before should now come in at good strength.

For all its simplicity in design, the "IK5-Four" is capable of very good results and as an ideal first set for the country enthusiast. In a later issue we plan to describe modifications which will allow this set to be operated conveniently with a vibrator power supply.

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FROM THE SERVICEMAN WHO TELLS

A couple of months ago I made reference to the difficulties presented by gain control in old style 4/5 valve autodyne superhets. Another approach to the problem is the application of a conventional AVC circuit, with a local-distance switch to eliminate distortion on very strong stations.

IN the normal way I do not relish spending excessive time over old receivers, since the charge to cover materials and labor can be out of all proportion to the value of the set. Normal policy is to keep them going in substantially the original fashion until such time as the owner decides to invest in something more modern.

However, occasionally one encounters a client with a very strong affection for the "old set" and who prefers to have it doctored and modernised, despite the expense.

It was exactly this way with a client recently who insisted that, while repairing a breakdown, I should go right ahead and modify his set to make it a little more pleasant to handle.

The story of the changes effected may be of interest to readers and the Editor has kindly arranged to have the new circuit drawn and published with this article.

The normal old style autodyne receiver has a gain control operating in the cathode circuit of the I.F. amplifier and arranged in some cases to short out the aerial in the fully off position. This type of control must be carefully adjusted at the outset and often gives trouble at a later date when the resistance element becomes worn or dirty.

Another difficulty is that the switching on of lights &c. may change the receiver volume, due to its effect on signal pickup via the power mains. With an A.V.C. system in operation changes in volume from this cause are countered automatically by the A.V.C. bias.

REVISED CIRCUIT

Seeking to avoid these difficulties, the receiver in question was rewired to conform to the circuit below. The 300 ohm limiting resistor in the cathode circuit of the I.F. amplifier valve was returned direct to chassis and the wire-wound gain control removed altogether.

Fortunately, the receiver already had a diode detector. This was simply rewired to provide an A.V.C. voltage, which was fed back to the I.F. amplifier grid in series with the I.F. transformer secondary.

The changeover involved substitution of a 0.5 megohm potentiometer for the fixed diode load resistor, this potentiometer becoming the audio volume control. The cathode of the diode-triode is earthed directly, and grid leak bias provided for the triode grid.

The remainder of the circuit is conventional enough, with a pentode output valve, tone control and an ordinary power supply system.

In the vicinity of strong stations,

one might expect the I.F. amplifier stage to overload badly under the conditions of high A.V.C. bias and large signal amplitude. In practice, however distortion due to overloading was not apparent in the particular suburban location. The A.V.C. levelled off the gain quite well, considering its limited action, allowing the 0.5 meg. potentiometer to control the volume in the usual way.

In the immediate vicinity of a strong station, where overloading might occur, the set could be operated with a relatively small aerial—say 3 or 4 feet of wire. A better method would be to instal a local-distant switch which cuts a small resistor in parallel with the aerial coil primary. The set is normally operated with the resistor in circuit but, for distant reception, the switch is thrown to the other position, making the aerial fully effective.

SELECTIVITY

The addition of A.V.C. to an old-style superhet often gives the illusion of having broadened the tuning, since it automatically allows the gain to rise as the set is tuned off strong local carriers. However, real ability of the set to separate adjacent stations remains substantially unchanged. This is far less important for everyday listening than the smoothness of control and freedom from fading effects which the addition of the simple A.V.C. circuit permits.

So many paragraphs without a single quip is a rather stout effort for yours truly, but that is rather by the way. What is more to the point is that the owner of the set was "tickled pink" with the new ease of control and the freedom from blasting effects when tuning suddenly on to a strong station.

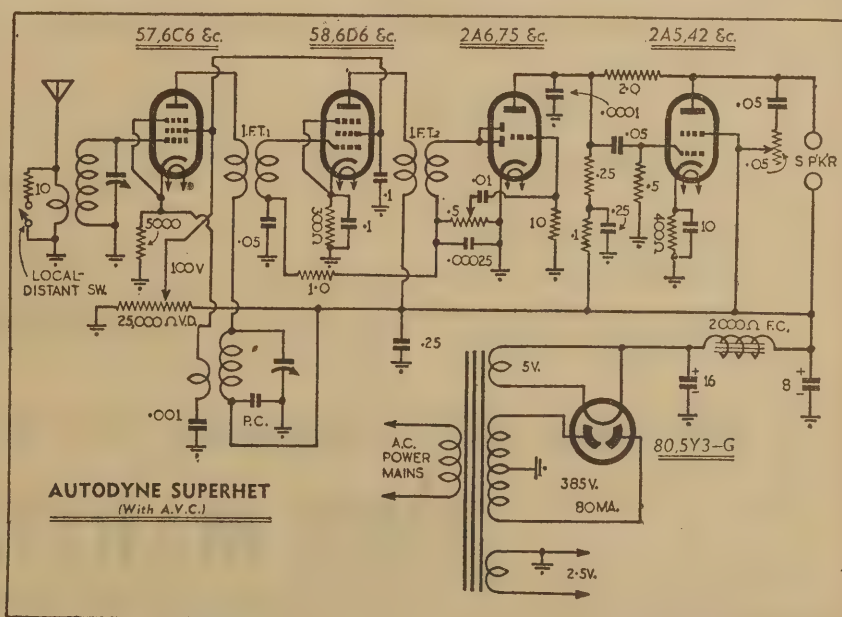
Incidentally, I forgot to mention that I fitted a new dial at his request, or rather a wartime edgelit job I happened to have on hand with a blank space on the rear card for the addition of station call signs by hand lettering. I must admit that the new dial, with station names, sailing ship and all—don't ask me what the last phrase signifies—did lend a modern touch to the set.

FITTING NEW DIALS

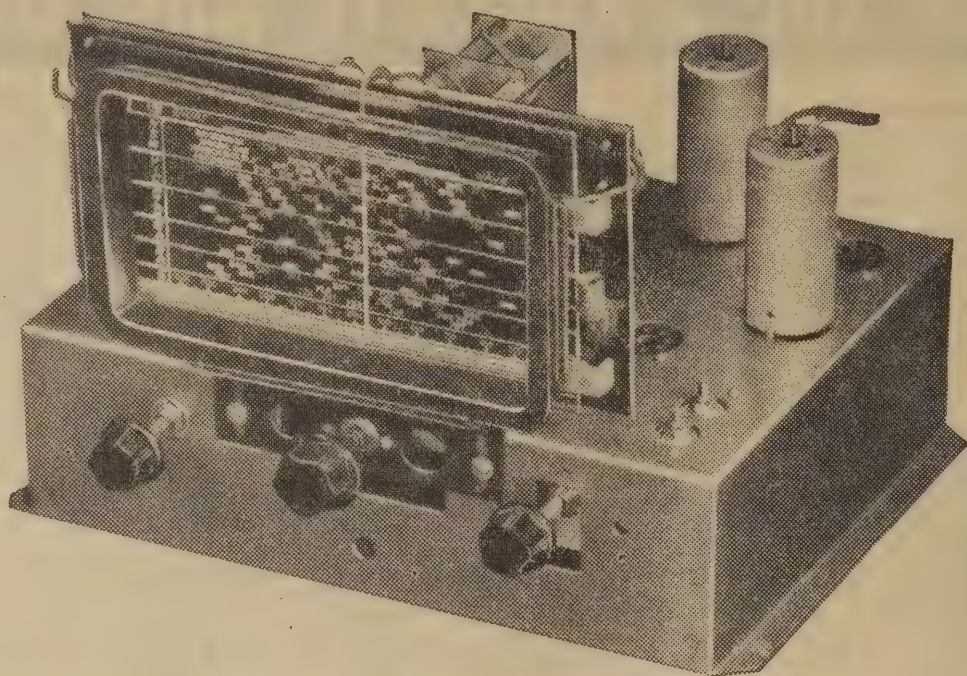
Talk of fitting new dials reminds one of the question which clients frequently ask on this general subject. Attracted by the design of some new model receiver, they ask whether a similar dial could not be fitted to the existing set. Or perhaps the request is more simply for something a little more grandiose than the existing fitment.

In the first instance, dials fitted to the major branded lines of receivers are usually made up especially for or by the manufacturer and fit in with his particular chassis layout. Some of them are a masterly combination of cords and pulleys, and all kinds of things may happen when you rotate the knob on the front panel.

The dial face and outer escutcheon are other items made especially for the particular brand of set and are not sold on the open market, for rather



Here is the complete circuit of a 4/5 valve autodyne superhet modified to incorporate AVC. The local-distant switch may still be necessary in some districts, but the set handles much more smoothly than in the original form.



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obvious reasons. Even if they were, they might not fit in with the contours of any other cabinet but the one for which they were especially designed. So, speaking generally, readers can forget the idea of copying the appearance of a branded receiver which happens to appeal.

Of course, there are plenty of dial movements on the market which cater for general requirements, from little fellows with sliding pointers to large and multi-colored sheets of glass.

Not all servicemen have the time or inclination to undertake major operations on a chassis and cabinet, preferring to maintain the status quo electrically and physically. However, if time and effort are available for sale, it may just as well be occupied in making alterations which a client fancies as in doodling on the letter pad.

CALIBRATION

The majority of dials now available are calibrated for either the Stromberg "H" type gang or the current AWA unit. Neither of these glasses will track accurately with earlier tuning condensers, and this is a major factor in planning such a change.

If the client is prepared to tolerate improper tracking for the sake of a pretty dial that is his affair, but I personally don't like it. Any obvious error in tracking is likely to reflect on the man who makes the change, no matter how careful he may be to explain the problems to the set owner.

The only way to ensure correct tracking is, of course, to replace the original gang condenser with the appropriate modern type to suit the dial glass. The capacity range of the new gang is almost certain to be wider than the older one, so that there is little or no danger of losing part of the band coverage.

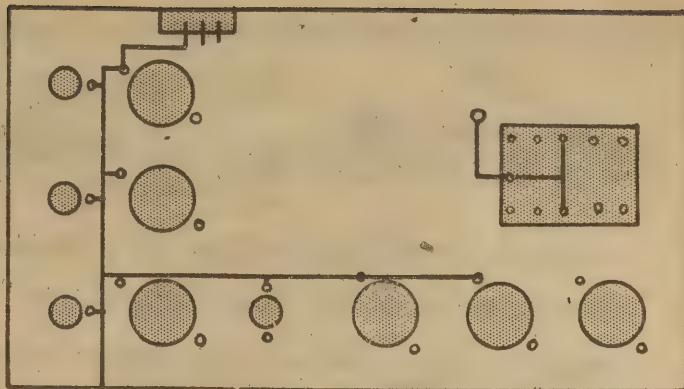
No change is necessary to the coils, since it is the condenser more than anything else which determines the distribution of the stations across the dial face. It is simply necessary to fit the new condenser and dial and follow normal alignment procedure to put the set into operation. If the original gang is fitted with trimmers, separate trimmers have to be connected in parallel with each section of the new gang.

MECHANICAL

So much for the electrical side of the matter. Mechanically it is a matter of seeing that the new gang fits on to the chassis, leaving room for the dial mechanism. The flywheel on many modern dials occupies a lot of space and requires a large cut-out, unless one dismantles the whole thing and mounts the parts independently on the chassis. So bear this in mind when you choose a dial or you may find yourself spending many hours sawing, filing and threading cords to keep faith with a promise.

The other point is, of course, that the new dial cut-out must include all the original cut and possibly the con-

An earthed busbar runs systematically around a chassis provides a handy return for condensers and resistors and contributes much to the general tidiness of wiring.



trol knob as well. And it must fit neatly into the general contour of the cabinet or you may get the effect of a bay window in a garret. There may be such things, but you know what I mean—or do you?

Anyhow, the main point is to appreciate the fact that there can be quite a lot to the simple request "... please fit a new dial to my set."

I.F. ALIGNMENT DRIFT

Numbered among my clients is a man who is very keen on short-wave and DX listening. His set is of old but rather ambitious design with RF stage and two low gain IF stages, a combination giving plenty of gain and selectivity.

But quite early in its life it showed evidence of a drift in alignment and, sure enough, the oscillator and output meter revealed considerable discrepancy in the setting of the IF trimmers. I thought little more of it until a couple of years later when a similar drift had to be corrected by further alignment.

The set had iron-cored IF transformers with mica compression trimmers—early types but nevertheless

Examination of the trimmers in one transformer showed that the fixed end of the compression plate was held to the ceramic moulding with a tubular brass rivet. The other end of the plate carried the usual threaded bush and adjusting screw. But the riveted end was not held snugly against the ceramic. There was a good sixteenth-inch clearance between the two, and the rivet had the appearance of having been stretched.

Thinking this may have been the trouble I simply put a nut and bolt through each of the six tubular rivets and tightened them as far as discretion would allow. The set was then aligned for the fourth time and given back to the owner with some assurance that it would be better this time. And, when last I heard, the alignment was still OK.

But the service game is like that, a mixture of very conventional troubles and others which are completely novel.

WIRING METHODS

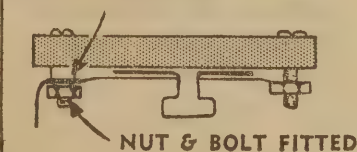
A young friend built up his first receiver and asked me to align it for him. It happened to be the broadcast version of Radio & Hobbies "Fire-side Five." Guess what? Much of the underneath work on the chassis had been done with the chassis resting on the adjusting screw of one I.F. transformer core. I mentioned this only a couple of months ago, but the results are still the same.

Another point was that he had omitted to put plenty of earthing lugs around the chassis, so that the components and wires normally returning to chassis radiated from the two available earth points like the petals of a flower.

When building a set, my first wiring operation is to instal several solder lugs at strategic points around the chassis then link them all up with a length of tinned copper busbar, stretched tight to remove the ugly kinks. With this busbar as a basis, most bypass condensers can be tucked tidily down against the chassis which leads at either end less than an inch long.

My young friend had most of the wiring components in mid-air and even the resistors on the resistor panel were not tucked neatly down against the lugs. These things come by experience, I know, but it helps to start out with the right idea.

RIVET STRETCHED



Compression trimmer adjustments can be upset if the anchoring rivet at one end of the plate tends to straighten.

quite good in performance. Mica compression trimmers are always subject to a slight change, but not to the extent revealed in this set. Still later it had to be aligned for the third time and I determined to discover why.

Of course, the IF transformers could have been changed for modern types, but I was loth to disturb a receiver which was excellent in all other respects. A change in IF transformers and coils sometimes brings troubles in its train and I was curious, anyway, to know what was wrong.

MINIATURE
KIT SETS



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(Radio & Hobbies, August, 1947)

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MORE POWER FOR PENTAGRID FOUR

By a simple addition to your 1946 Pentagrid Four, considerably higher power output is available at the turn of a switch. The set normally operates as an economical four-valve job but, when you want to hear a musical number to best advantage, the power output can be doubled by switching in an extra valve.

THE general idea was utilised some years ago in a couple of our earlier "Pentagrid" receivers. Without being particularly clever, it is just one of those handy circuit arrangements about which a few readers will say "just what I was looking for."

The "Pentagrid 34," "Pentagrid 46," and "Pentagrid 57" all incorporated this principle, the optional valve being wired to operate in push-pull with the normal output stage. A certain amount of mismatch occurred, but there could be no mistaking the effect of the extra valve.

PARALLEL VALVES

But why push-pull? There are a few academic points in favor of a push-pull connection, but one has to provide a transformer or phase inverter stage to excite the second valve.

Against this, the parallel connection provides practically the same power output and does not require additional components.

So we installed the extra valve socket and simply connected all useful pins across to the corresponding pins of the first 1L5-G. That is, all except the A-plus connection.

Most readers will be using a three-position three-pole wafer switch for

the "off-on" control, and this can be wired as shown.

In position 1, all filaments are off. In position 2, the first four valves are switched on, and the receiver operates as a normal four-valve set. Position 3 leaves these four filaments on and switches on also the extra output valve and the dial lamps.

BIAS VOLTAGE

Now let us see what happens when the extra valve is switched on. Naturally it draws current through the back-bias resistor and develops a higher bias voltage across it.

If this condition were not corrected, the high bias would largely offset any advantages conferred by the extra valve. So the third set of contacts on the switch is wired to introduce an extra resistor in shunt with the normal 400 ohm back-bias resistor. By this means the bias is maintained at the correct value.

Some compromise is necessary in regard to load impedance. Ideally it would be 7500 ohms for two valves and 15,000 ohms for one. We suggest a compromise value of 10,000 ohms, so buy your speaker with a 10,000 ohm input transformer.

The two valves deliver just about twice the power of a single one for any given grid signal voltage, so that the power sensitivity of the stage and

the overall gain of the receiver are increased accordingly.

The high tension drain varies somewhat with the input signal and operating level, but it rises from about 13 milliamps for four valves to just over 18 milliamps for five valves. Odd periods of operation with this drain will not distress heavy duty B-batteries, but the desirability of switching the valve off and on as required is obvious.

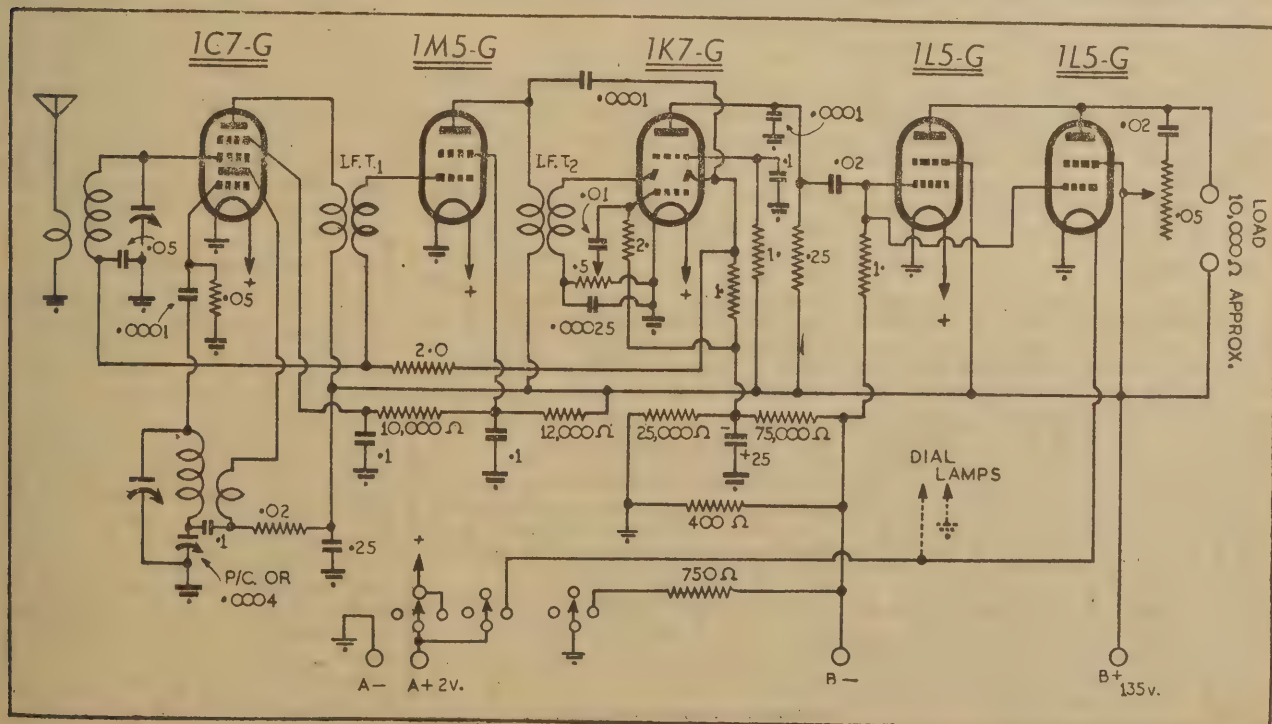
90-VOLT OPERATION

With a high tension supply voltage of 90, the high tension current figures are 9 milliamps for four valves and 12.5 milliamps for five valves. The latter figure is a moderate one and, if operation from only two B-batteries is necessary at any time, use of the extra valve would offset the loss in output incurred by the reduced supply voltage.

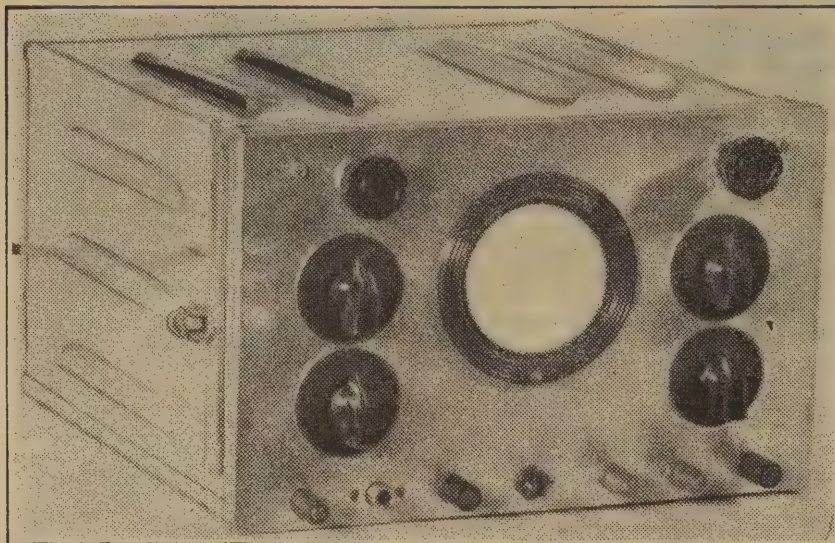
It is essential to understand the exact purpose of the extra valve, irrespective of the supply voltage. Let's say you are listening to a particular item and want plenty of volume. You turn up the volume control and ultimately reach the point where the output valve reaches overload point. Turning the control up further simply causes a lot of distortion.

At that point you click the switch to the next position. In comes the second valve and up goes the volume to the desired level, but free of distortion.

The valve is not there simply to increase the overall gain of the set. If gain is the main consideration, then one must begin at the other end of the receiver and add an R.F. amplifier stage. But that is a much more expensive and involved business.



SIMPLE C.R.O. AND AUDIO OSCILLATOR



Here is the unit in its cabinet. Left controls, top to bottom, are intensity, vertical amp and horizontal amp. Right controls are focus, frequency and audio output. Terminals from the left are: H plates, key jack, V plates, sweep switch, high AF output, and low AF output.

This handy little device has already proved its value in the testing of audio amplifiers and modulators. It is in constant use at VK2JU as a monitor on all transmissions in conjunction with the tuning unit described in Nov., 1946 issue, which avoids direct connection to the transmitter.

IN the November, 1946, issue of "Radio and Hobbies," we gave a description of a simple oscilloscope suitable for those important occasions when one desires to check a newly completed amplifier, receiver, modulator, &c.

This little 'scope performed admirably. However, it was felt that some source of built-in audio-frequency would extend its usefulness in many ways. We wanted to provide for the addition of deflection-plate amplifiers later on, without greatly departing from the simplicity of the basic circuit, its low cost, and small number of parts.

A glance at the circuit will show how we have gone about it.

THE CIRCUIT

The type of cathode-ray tube used, the VCR139A, has been in plentiful supply via the Disposals sales. Unfortunately, however, information concerning the base connections and the recommended voltages for the tube elements has not been too widely known. This fact, in itself, makes it very awkward to build it into a simple piece of apparatus. The tube itself is an excellent job. The definition of the trace is good, and there is very little astigmatism or distortion of the trace from other causes.

Apart from the C.R.O. voltages, full-wave rectification is desirable for the audio oscillator, as well as for possible additions to the circuit. With full-wave rectification, and the rectifier

working into a reasonable capacity, our expectation was about 530 volts, bearing in mind the low current drain.

Tests showed that the tube functioned quite satisfactorily on this voltage. Moreover, the sensitivity of the deflection plates was greater than when the maximum recommended 1000 volts were applied.

SENSITIVITY

This, of course, is to be expected from our general knowledge of cathode-ray theory. We know that the speed of electrons is influenced by the potential of the tube element to which they are attracted. In a cathode-ray tube, the slower the speed of the electrons travelling through the final accelerating anode towards the screen, the longer will be the time during which they are under the influence of the deflecting plate voltages. This means that the electron stream will be deflected to a greater extent for a given

voltage on the deflecting plates.

It is seen, therefore, that the low voltage is really an advantage, because it allows us to do more without providing conventional amplifiers for the deflection plates.

We may add these amplifiers at a later date, and publish details of how to do it.

Transformers of 80mA rating and higher usually have two 6.3-volt windings, but it is not absolutely necessary to use separate filament windings for the C.R.O. and audio oscillator. Moreover, a 60mA transformer will be sufficient to supply the existing circuit plus the extra drain for the later additions. We show these components on separate windings merely because the transformer, which we had on hand, had two windings.

The C.R.O. tube will draw 1.1 amps, the 6J5 will draw 0.3 amps, giving a total of 1.4 amps. A 2-amp winding will cater for this drain, with enough to spare for additions.

HEATER VOLTAGE

You will note that when the VCR139A has 4 volts applied to the heater it will draw its rated 1.1 amps. Operating this from the 6.3-volt winding requires the insertion of a dropping resistor of 2.1 ohms, which can easily be made up from normal resistance wire.

In the job shown in the accompanying photographs, we used approximately three inches of resistance wire from a heavy heater dropping resistor. It warmed up slightly but not unduly.

The rectifier works into a conventional condenser input filter. The condensers should be of the 600-volt type, to withstand the high voltage. With the present drain on the power supply of only a few milliamps, the voltage output from the filter is very close to the peak voltage to which the condensers are charged.

The filter choke should be 6 henries or more to provide adequate filtering. The amount of filtering is important with this C.R.O., for reasons to be explained.

GUN CONNECTIONS

You will note that the circuit for the C.R.O. electron gun voltages is fundamentally different from the conventional hook-up. In this circuit, we have the accelerating anode and one of each pair of the deflecting plates above ground by the high-tension voltage. It was easier to place these elements above ground rather than to reverse the procedure and place the other components above ground. This, of course, was made necessary by the desire to supply the entire unit from one transformer and one rectifier. The slight difficulty could be overcome by the addition of one more rectifier wired for half-wave rectification and utilising one-half of the transformer winding. However, the cost of one re-

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sistor and one condenser as against that of another rectifier rules that scheme out.

With the conventional method of hook-up, the accelerating anode and one of each pair of the deflecting plates are at ground potential. Under these circumstances, the application of a sweep voltage between the X2 plate and ground and the voltage to be examined between the Y2 plate and ground, does not present any difficulty.

However, when the position is reversed, as it is here, an interesting problem is revealed.

In tracing out the return circuit of the X2 and Y2 plates to X1 and Y1 respectively, you will find that the second filter condenser is in the circuit. Now, if there is appreciable ripple voltage across this condenser, and one of each pair of the deflecting plates were connected directly to the accelerating anode, the ripple voltage will affect the trace. The general effect is to extend the normal spot into a short 45-degree line, thereby making it impossible to obtain a sharp trace.

To overcome this, we inserted a simple isolating circuit between the particular deflecting plates and the accelerating anode. It was quite effective and permitted us to use the 50 cycle source for a sweep voltage. As you will see, all four of the deflecting plates are connected to the accelerating anode via isolating resistors. This achieves the desired result of maintaining the deflecting plates at the same d-c potential as the accelerating anode, and also provides a balancing action to prevent the ripple voltage from affecting the trace.

C.R.O. SHIELD

To prevent external fields from distorting the trace, it is the general practice to enclose the C.R.O. in a shield. The field from the power transformer can cause such interference.

In this unit, the shield takes the form of a four-inch length of two-inch inside diameter galvanised iron pipe supported on the chassis by two long bolts. Two-inch pipe is virtually the minimum size which will allow a small amount of sponge rubber packing to be inserted between the tube and inside of the pipe. In addition to acting as a shield, it permits the pipe to be employed as a support for the tube.

With this shield in place, movement of the transformer about the chassis whilst the unit was in operation made no difference to the trace.

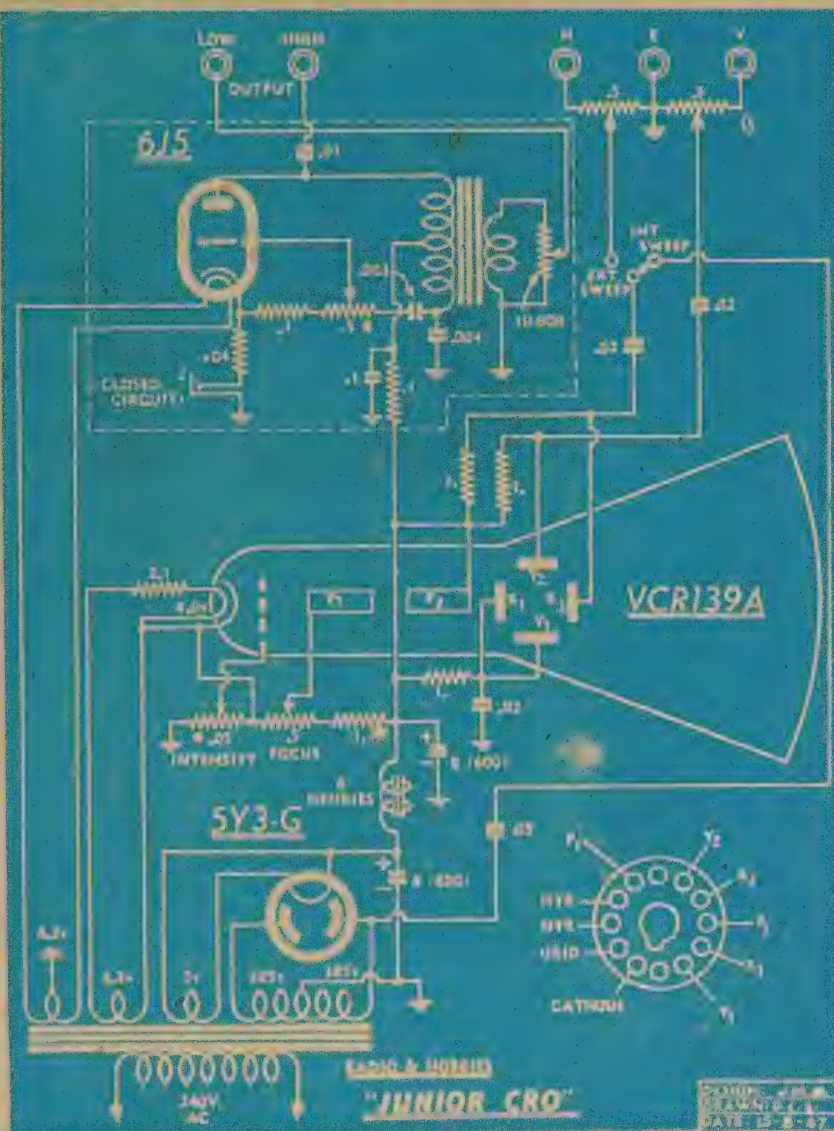
The lead to the X2 deflecting plate is switched to provide for external time base voltage sweep.

AUDIO OSCILLATOR CIRCUIT

The design and operation of the audio oscillator circuit is dealt with more thoroughly elsewhere in this issue. With this in mind, we will mention only those points which show greatest variation when using alternative components to those shown in the circuit.

It must be realised that, in addition to providing oscillations at an audio frequency, the unit should produce them as near as possible to a perfect sine wave. For it is very much easier to work with a sine wave, when checking amplifiers for distortion on a cath-

CIRCUIT DIAGRAM OF THE UNIT



The circuit is the essence of simplicity.

ode ray oscillograph.

The greatest source of variation is in the type and quality of the audio transformer. Using the value of tuning capacitance shown in the circuit, it is logical to expect different frequency coverage with other transformers. This, in itself, is not extremely important.

The major variation is in the shape of the output waveform.

For a given set of conditions, variation in the inductance of the oscillatory circuit, i.e., the transformer, will alter the magnitude of the feedback voltage.

A glance at the circuit will show

PARTS LIST

1 chassis 11½ x 10 3-8 x 1 3-8in. (see text.) Front panel 11 x 7in.

1 power transformer, 385v. CT, 385v; 6.3v. at 2 amps. (see text), 5v. at 2 amps.

1 high tension filter choke, 6Hy. (or more) 40 mA.

1 speaker transformer with centre-tapped primary winding (see text).

4 indicator plates.

1 closed circuit phone jack.

1 3in. escutcheon.

CONDENSERS

2 8 mfd. 600 P.V., 1 .1 mfd tubular, 1 .01 mfd. tubular, 3 .02 mfd tubular, 1 .05 mfd. tubular, 1 .003 mfd. mica, 1

.004 mfd. mica.

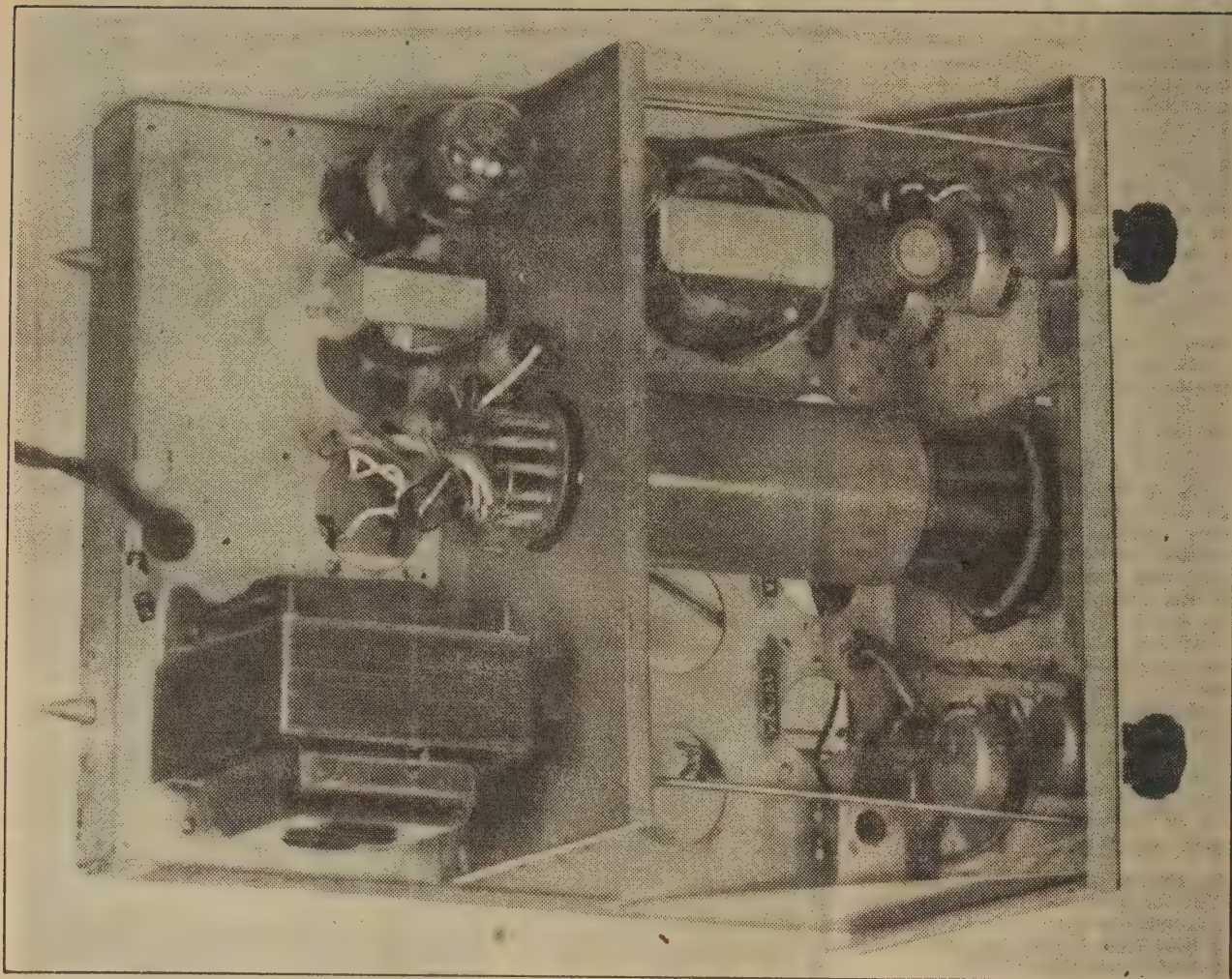
RESISTORS

4 1 meg., 2 .1 meg., 1 .04 meg., 1 2.1 ohm W.W. (see text), 4 .5 meg. potentiometers, 1 .05 meg. potentiometer, 1 10,000 potentiometer.

VALVES: 1 VCR139A cathode ray tube, 1 5Y3G, 1 6J5G (see text).

SUNDRIES: 1 12 pin CRO socket, 2 octal sockets, 6 knobs (includes 4 pointer knobs), 1 toggle switch, 5 terminals (suitable colors to aid identification), 4in. of 2in. inside dia., galvanised pipe (see text), terminal strips, sponge rubber (see text), sub-panel (see text), bolts and nuts, hook-up wire, power flex, spaghetti.

PLAN VIEW OF C.R.O. AND AUDIO OSCILLATOR



that, in addition to positive feedback existing through normal oscillatory condition, there is negative feedback purposely introduced by leaving the cathode resistor unbypassed. Generally speaking, the amount of this negative feedback governs the purity of the output waveform. It follows that the value of the cathode resistor has a direct influence on the output waveform.

For a given set of conditions, variation in the inductance of the oscillatory circuit will alter the magnitude of the positive feedback voltage. This means that for different transformers, the value of the cathode resistor should be adjusted, for the nearest approach to sine-wave output. Fortunately, the effect of different valves of cathode resistors can be observed on the C.R.O. itself, merely by connecting the high output terminal to the vertical deflecting plate and switching the horizontal plate to internal sweep. The resulting pattern on the screen can be made to remain fairly steady by manipulation of the variable grid leak of the oscillator.

OSCILLATOR FEEDBACK

In the original unit, we used a Rola G12 speaker transformer designed for

The power transformer, valve socket, filter choke, and rectifier, are in the rear compartment. The audio transformer is at the top of the front compartment, the valve immediately to the rear. Note the section of heavy piping which shields the CRO tube. Other controls are also visible.

pushpull audio output. The values of the other components in the circuit have been adjusted for an almost perfect sine-wave output.

The grid leak is made variable by the insertion of a potentiometer. This permits a degree of control over the frequency of the output. The resistor in series with the potentiometer sets a lower limit to the value of the grid leak, where oscillations are still maintained. In our unit, this control gave a swing in frequency from approximately 800 cycles to 1100 cycles. As to be expected, the output level drops off at the high frequency end of the control. The values of the condensers also play their part in varying the frequency limits. The actual frequency swing is not important, though the closer the mean frequency is to 1000 cycles, the better.

KEYING JACK

Any triode would be suitable in place of the 6J5 but, again, it would be necessary to adjust the cathode resistor for best sine-wave output.

Included in the cathode circuit is a closed circuit jack. This was inserted to permit the oscillator to be keyed for Morse code practice or for use to provide tone modulation for MCW work in amateur stations. For Morse code practice, a pair of headphones connected to the low output terminal will give plenty of output.

The output control needs no explanation. It is merely a potentiometer of suitable value to give control over the output level.

CONSTRUCTION

We feel that the majority of the parts would be found in that box of bits and pieces which sits in the corner or under the bench in an experimenter's workshop. If not already on hand, most of the items can be easily procured.

In our case, we used an ex-disposal chassis which had a host of odds and ends still attached to it. When duly stripped down, we tried the little

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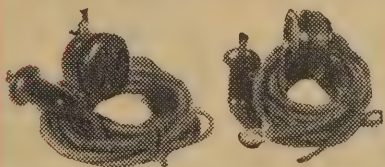
A high grade insulator, similar to pre-war pyrex, 7" long ... **3/6**

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VALVES

6J5G. Standard 6.3 volt octal base triode ... **10/-**
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EA50 Miniature U.H.F. 6.3 volt diodes ... **7/6**
EF50 High frequency RF penthode. 6.3 volt, 9 pin base. This type is not boxed but is guaranteed as new **10/-**
Postage & packing on valves 1/- ea.

NAVY CARBON MICROPHONES



SINGLE BUTTON TYPE, complete with cord. Right hand illustration ... **3/6**
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A heavy duty solid brass key, mounted on wood base. Large terminals, quality contacts. Fully adjustable ... **5/-**
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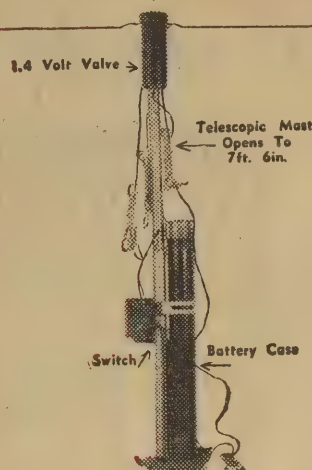
PHONE AND MICROPHONE

Set consists of a standard breast type carbon microphone and low impedance single head phone, with band and cords. Fitted in wood carrying case. **10/-**
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"Walter" is a distress transmitter, as used in rubber dinghies. The unit consists of a 7' 6" light weight telescopic tubular mast. Attached to the top is a dipole and single valve, blocking oscillator, operating on 178 mc/s. A tubular battery container is attached to the base. There are many uses for the parts in this set, e.g. Two of the telescopic masts can be used as a dipole, with a weight of only 12 ozs.

This set is of no use for operation in its present form.

12/6

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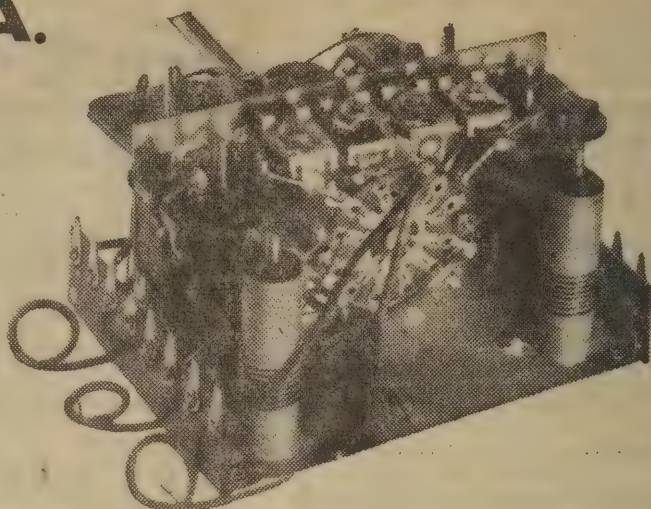
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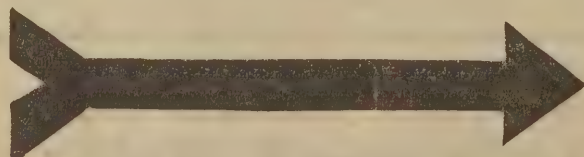
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ADDRESS

VCR139A for size. Within a few minutes, we had a power transformer, rectifier and this and that in various temporary positions on the chassis. In short, we found that the chassis would do nicely.

The front panel was blanked out with a piece of aluminium to cover up the unwanted holes. With drill, hacksaw and files, it was not long before the front panel began to look like a front panel for a test oscilloscope.

If anything, the chassis was a little on the shallow side. However, we managed to squeeze the smaller components into their respective places. Frequent use was made of terminal strips to enable the components to be mounted in a rigid fashion. This is important, if the chassis and attached front panel is to slide in and out of a case. We might add that the location of the existing valve base holes in the chassis had an influence on the positioning of components. It is left to the individual constructor to arrange the layout for the neatest result.

THE CHASSIS

The method of construction is open to variation, and so any suitable chassis which you may have on hand will do the trick. On the other hand, if you decide to make a chassis, we would suggest that you allow sufficient room to enable the power transformer to be mounted directly behind the C.R.O. Furthermore, another inch on to the depth of the chassis would be of great assistance in the mounting of the underneath components. Extra depth will allow greater clearance for the terminals along the bottom of the front panel.

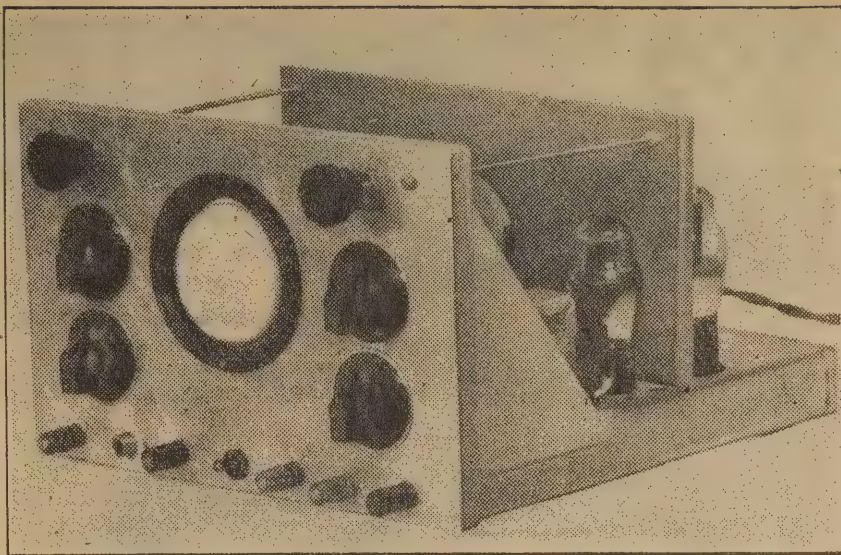
From the photographs, you will notice a sub-panel mounted some two-thirds of the distance to the rear. This was to provide mounting for the C.R.O. and also shielding between the power supply and the remainder of the circuit. This sub-panel, when braced to the front panel by two screwed rods, is quite rigid.

The socket which we had for the C.R.O. had no easy means by which it could be mounted on a panel. To overcome this, we made the hole in the sub-panel large enough to clear the socket. A bracket was mounted just below this hole and a clamping band was made to pass around the base of C.R.O. and attach to this bracket. The tube base was insulated from the clamp and bracket by sponge rubber.

The tube is further supported via sponge rubber by the pipe shield. The screen end rests in a bakelite escutcheon. If the individual decides on a mode of construction whereby the tube is grasped by a sponge rubber ring clamped to the front panel, the clamp and bracket at the base of the tube may be dispensed with.

OPERATION

When all the constructional work is completed, check your wiring. Make sure that you have the correct deflector plates connected to the X and Y amplitude controls. We have marked the plates in the C.R.O. with X and Y references and the input terminals to these plates with H and V. In employing the two references, confusion



Another view of the unit showing the audio oscillator valve.

should be avoided. What are referred to as the horizontal plates are also the X plates. Similarly, the vertical plates are the Y plates.

If the wiring is in order, insert the C.R.O. and the rectifier in their respective places. Before plugging into the A.C. mains, have a multimeter handy, set to read on the low voltage A.C. scale. Turn all controls on the front to the off position.

As you switch the unit on, keep an eye on the rectifier. If there is any indication of a blue glow (in the high vacuum types only), switch off immediately and check the rectifier circuit for a short circuit. A blue glow in a high vacuum rectifier indicates that there is excessive current drain.

If that section is in order, check the heater voltage actually present at the C.R.O. Pins, 3 and 4 are the ones concerned. If the meter is reasonably accurate on the a-c scales, this should read 4 volts. Of course, if you are using a transformer with a four volt winding, all should be well. Check it just the same, though.

With the multimeter set on the 1000 volt d-c scale, check the voltage at the output of the rectifier, and then at the output of the filter. The two readings should practically coincide, because there is little or no current drain without the audio oscillator plugged in. With such little current drain, the voltage drop across the filter will be almost negligible.

If, up to this stage, everything checks to be in order, slowly turn the brilliance control clockwise. When the spot appears, rotate the focus control until the spot is as clearly defined as possible. Adjust the brilliance and the focus until the spot can just be clearly seen. While you are doing this, exclude as much light as possible from the screen of the tube.

If the spot is a nice pin-point, is circular and clearly defined, turn the X plate switch to Int. Sweep. Adjust the X plate control until the screen nicely contains the trace. Check the focus setting and inspect the trace for astigmatism. This is indicated by uneven focus throughout the length of the trace. It is most unlikely that

this will occur, particularly with this small size of tube. Some of our readers may recall the astigmatism controls on radar equipment in use during the war years. With the large size of C.R.O. tubes in use in that equipment, it was necessary to provide for control over astigmatism.

Having gone so far now with the checking of the operation of the unit, the time has come to plug in the audio oscillator tube, the 6J5G. As you do so, watch the trace for any distortion attributable to the extra current drain. All should be in order, however, because the balancing of the deflector plates, as mentioned previously, is quite effective.

Now take a lead from the high output terminal of the oscillator and connect it to the vertical deflection plate. You should see a sine-wave pattern on the screen. It may be stationary or moving, depending upon the position of the frequency control.

Hold the pattern by juggling the frequency control, and observe the output waveform. More than likely, you will need to experiment with the value of the cathode resistor of the 6J5G.

From the brief references to factors governing the operation of the oscillator, and the more complete coverage given elsewhere in this issue, you should find no difficulty in obtaining a nice sine-wave output.

You will be able to get a rough idea of the frequency swing with movement of the frequency control by observing the pattern on the screen. Beginning with the control at one end, slowly turn it through its travel. At the positions of the control where the pattern is stationary and one waveform is overlapping the other, count the number of peaks along the top or bottom of the pattern. This figure is the number of times that the oscillator frequency is greater than the sweep frequency, which, in this case, is 150 cycles when the patterns overlap.

The fact that we have an A.C. sweep voltage in lieu of a pulsating D.C. sweep voltage is the reason why we get that edge-on view of a rotating

(Continued on Page 95)



A READER BUILT IT!

Gadgets and circuits which we have not actually tried out, but published for the general interest of beginners and experimenters.

NOVEL CABINET FOR SUPER-SIX

BREAKING away from conventional design, Mr. W. D. Brennan, of Merredin, WA, housed his "Super Six" receiver in a cabinet patterned on studio rather than domestic receiver design.

The cabinet stands over 6 feet high and is finished in a cream lacquer.

The speaker system is in the top section of the cabinet, the openings being masked by chromium plated grilles. Below that is a section housing the receiver proper. Mr. Brennan has chosen to fit pilot lights, power and pickup switches, magic eye tuning indicator, circuit meter and other devices which lend a professional air to the setup.

Possibly the most interesting feature is the mounting arrangement for the gramophone motor and pickup. These are mounted on a quarter circle section of the cabinet which is hinged at one corner. When the section is closed, it appears as a flush-fitting door. When it is swung open, as shown in the closeup photograph, the turntable and pickup are brought forward within easy reach.

At the time of writing, the receiver was operated from the d-c power mains and a spring motor was used. However, with the expected alteration to a-c supply, it was intended to convert the receiver back to conventional a-c operation and to install an a-c gramophone motor. (From W. D. Brennan, 70 Kitchener-road, Merredin, WA.)

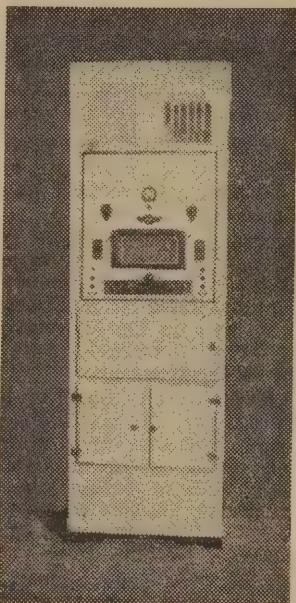
BROKEN DIAL GLASSES

ONCE broken, many prewar edge-lit dial glasses cannot be replaced. A satisfactory repair can often be effected with the aid of medical sticking plaster and clear cellophane.

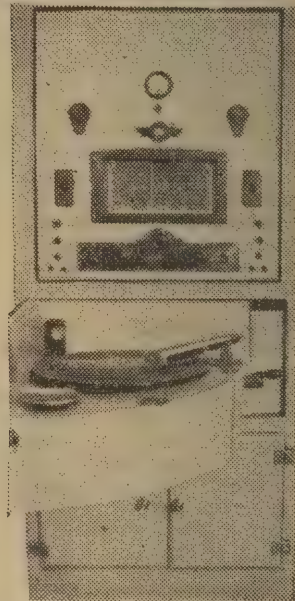
Collect all the major fragments, fit them together in the proper relationship on a table and bind round the edges with sticking plaster. Then, with a razor blade, cut away the tape opposite the dial lamps, to allow the light to shine through.

Finally, fit any small pieces and chips of glass into place, and press a sheet of clear cellophane over the face of the glass. Fold it carefully around the edges to the back of the dial and glue in place.

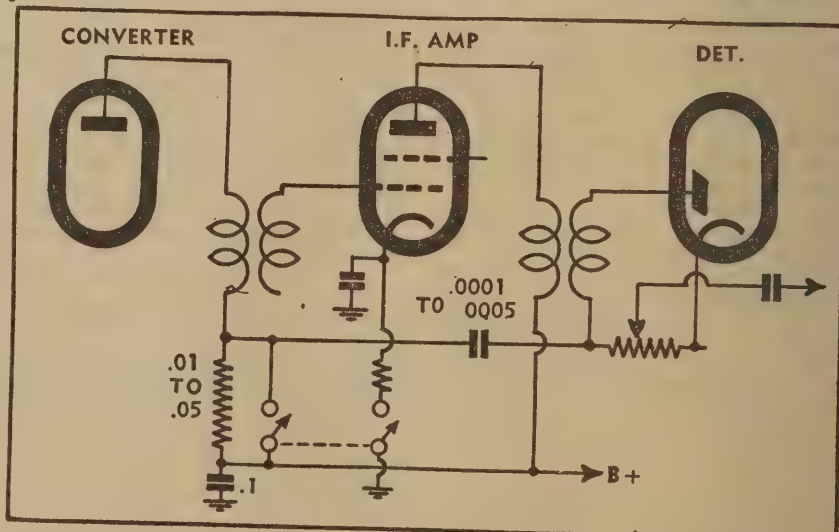
If done neatly, the repair is not obvious to the casual observer looking through the escutcheon glass.



This general cabinet design will probably interest readers who like to impart a professional and yet tidy appearance to their pet receiving and amplifying equipment. It combines the simple lacquered construction of modern furniture with the atmosphere of studio equipment. Note the hinged quarter-circle section carrying the gramophone motor and pickup.



SWITCHES FROM SUPER TO TRF



From Mr. E. F. Freeman, of 2 Dalton-avenue, West Hobart, Tas., comes this interesting scheme for switching from superhet to TRF operation. The change-over is accomplished without switching "hot" leads likely to produce instability. In the superhet position the circuit operates normally except that the diode bypass is grounded via the B-plus line. In the TRF position, the same condenser couples the diode to the plate circuit of the converter, which now operates as a resistance coupled R.F. amplifier. The I.F. windings have no serious effect on signals at other than at their resonant frequency, while the I.F. amplifier is rendered inoperative.

TRADE REVIEWS AND RELEASES

"B.R.S. JUNIOR" HOME RECORDER

Meeting the need for an inexpensive recording unit, the Birnbach Radio Co. (A'sia.) Pty. Ltd. has recently released the B.R.S. Junior recorder and playback unit. Neat and compact in appearance, it can be installed as an integral part of a radio gramophone combination.

THE unit consists of a 12-inch turntable mounted on a sandcast aluminium base and rim-driven by a synchronous electric motor. A special radius arm beneath the base plate is driven by a series of worm threads and mechanically coupled to the pickup/recorder arm.

For recording, a lever engages the worm thread and radius arm and the arm is driven across the surface of the disc from inside to outside. For playback purposes, the drive to the arm is disengaged and the same arm and head serve as a magnetic pickup.

The shank of the needle makes an approximate 70 degrees angle with the surface of the record, so that conventional high grade needles can be used for play-back purposes. For recording, a specially ground steel

stylus is inserted in the chuck which presents the cutting face substantially at right angles to the surface of the disc.

The impedance of the magnetic head is of the order of 2000 to 4000 ohms, depending on frequency, so that it can be fed, for cutting purposes, from the plate circuit of a conventional output valve through an appropriate condenser, and without prohibitive mismatch. Approximately 2 watts of audio power are required for full amplitude under average conditions. As a pickup, the head has a fairly



low output and therefore needs to be used with an audio system having fairly high overall gain. A suggested circuit is supplied by the manufacturers showing the switching necessary to arrange the unit with a conventional receiver for recording of playbacks with speaker monitoring.

The unit can be applied quite simply to record programmes heard over the air and, with microphone and preamplifier equipment added, recordings can be made of domestic interest, for educational purposes, or yet again as a sound accompaniment to sub-standard home movies.

The unit is being adopted by some firms as equipment for luxury radio-gramophone combinations, providing recording facilities as an added feature. The finish is in brown wrinkle lacquer, with brown felt on the turntable.

RETAIL PRICE

The BRS Junior Recorder retails for £45/17/6. Special non-ageing blanks are available in diameters of 8, 10 and 12 inch, the respective retail prices being 4/10½, 6/1 and 7/10½. Their life can be extended to approximately 100 playings under good conditions by careful use of "Discol" hardening fluid. The steel cutting styli will cut from 10 to 30 sides before serious diminution of quality becomes evident.

A production model was submitted to "Radio & Hobbies" for test purposes and some excellent cuts were made, particularly of six metre amateur stations.

The equipment is distributed by the Birnbach Radio Co. (A'sia) Pty. Ltd., 55 York-street, Sydney. Supplies of discs, &c., can be arranged through local radio dealers.

CROWN DP3A UNIT AVAILABLE

IN TENDING 'large-set constructors will be pleased to know that the Crown DP3A tuning unit is available once again. Owing to component shortages, production had been seriously curtailed for many months.

The DP3A is a dual-wave unit of moderate size which incorporates provision for an RF stage ahead of the converter valve. It is in two sections, the aerial coils and switching being in front and the RF and oscillator circuits behind the dividing partition.

The unit is suitable for use in "R & H." dual-wave receivers incorporating an RF stage.

It can be mounted by a single hole through the front of the chassis, or by four bolts through the base plate. The "hot" leads are brought out to lugs along one side of the unit while pilot lamp switching and B-plus lugs are on the other side. A card packed with the unit shows clearly the various connections.

All cores have adjustable iron slugs for low frequency tracking and mica compression trimmers accessible from beneath the chassis.



MULLARD FACTORY

MULLARD-ENGLAND has opened a new factory at Gillingham, Kent, for the assembly of the component parts of miniature valves. The sub-assemblies are transported from Gillingham to Mitcham, where the filaments are inserted and the complete assembly sealed into the bulb.

Electronic Transmission Equipment Ltd., is the name adopted by a new company formed by Mullard England for the development and manufacture of communications apparatus. It will take over the present communications activities of Radio Transmission Equipment Ltd.

— DISPOSAL BARGAINS —

★★ ALL ☆ GUARANTEED ☆ NEW ★★

CO-AX CABLE

72 ohm.
No. 11 Du-Radio
Twin.
1/- per yd.
Minum, 10 yards.

RESISTORS

.1 1 watt, 3/- doz.
IRC. 150 ohms
16 watt, 9d.
10,000 ohm, 5 watt
9d.

WALKIE TALKIE

Complete with Head Set, Microphones,
Spare Valves.

22 to 25 meg. Range to 3 miles.
Require 67v. B. Bat. 1½v. A. Bat.

£6/10/-

MINE DETECTORS

Complete with 5. 1-4 Valves. Add coil and
Condenser to make Portable Radio.

£6/0/0 ea.

CONDENSERS

MICA

.00006, .000125,
.0005, 4/- doz.
.001, .005, . . 5/- doz.
.1 Tubular . . 5/- doz.
.5 Block . . . 5/- doz.
2MF Block . . 5/- doz.
IMF 5/- doz.
250MF 12v. 5/- doz.
IMF 4000v. . . 5/- ea.
4MF 2000v . . 8/- ea.

Audio Transformers
Ferranti £1/5/-

PLEASE ADD POSTAGE OR FREIGHT

WAVE METERS

CLASS C.
New. Less Vibrators.

£4/10/0

NEW VIBRATOR TRANSFORMERS

By A.W.A.

Input	Output	
12v.	400v. 200MA.	£1/5/0
6v.	225v. 200MA.	£1/2/6

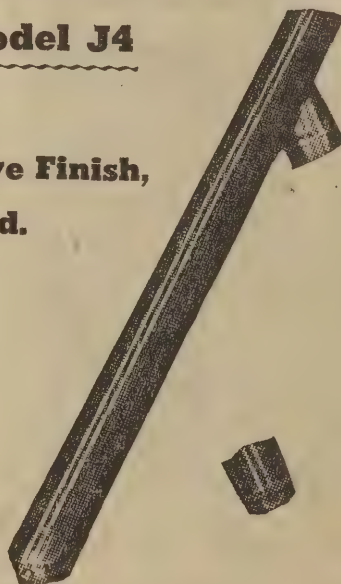
LEAD COVERED CO-AX 72 OHM. SINGLE. 1/- PER YARD.

EXCELAIR RADIO,

136 Victoria Rd., Marrickville. Phone, LA1604

Kenacoustic Model J4

Entirely New, Attractive Finish,
Scientifically Designed.



Crystal Pick-up

Price £3'5'0

Available Now in Victoria
Soon in all Australian
States.

- (1) New improved type of crystal, completely sealed against moisture.
- (2) Revolutionary crystal damping, giving wider frequency range.
- (3) New and improved needle chuck, exceptionally light movement.

- (4) Flexible coupling between crystal and needle chuck.
- (5) Totally enclosed, compact, all metal arm.
- (6) Tracking angle built into the arm, giving tracking similar to offset head or bent arm designs.

RETAILERS—For orders or supply information write to

J. K. IBBOTT, 142 QUEENSBERRY STREET, NORTH MELBOURNE, VIC.

IMPORTED LOUDSPEAKERS FROM PHILIPS

Illustrated on the right are two of the new 12-inch loudspeakers imported by Philips Electrical Industries Aust. Pty. Ltd. The speakers, which have been shown on test to have a particularly good high frequency response, are rated respectively to handle 10 watts or 25 watts of audio power.

THE cone and centre spider have been carefully designed in both cases to avoid random resonance effects and the new "ticonal" steel magnet ensures a very high field strength in the air gap. Specifications for the two speakers are as follows:

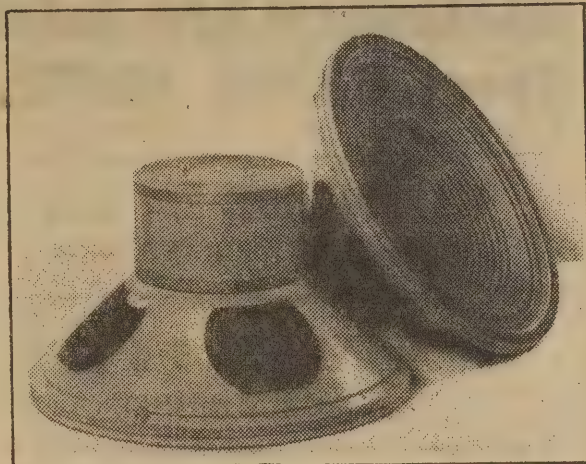
Type	9809T	9806T
Maximum Wattage	25	10
Imped. at 1000 c/s	15	15
Speech coil volts	19	12.5
Field gauss	17,000	14,500
Res. freq. c/s	75	75
Depth of spkr.	7½"	5½"
Outside diam.	12½"	12½"
Weight, less transformer	17lb.	12½lb.

The type 9802T is a small diaphragm speaker for use in multi-cellular horns. It is recommended for use in open

air or theatre installations where high quality is required with high audio power. The power rating is 10 watts, assuming the use of a properly designed loading horn.

The combination of a 12-inch bass speaker with a high frequency unit forms the basis of the wide range "Bi-Tone" speaker system. The bass speaker is housed in a reflex loading cabinet and the high frequency unit operates into a 6-cell horn. Specifications for the "Bi-Tone" speaker combination are as follows:

Cabinet, 32½" high, 17½" wide.
Frequency range, 20-13,000 cps.



Max. capacity, 12½ watts.
Matching transformer, To specification.
Cross-over net., 500cps.
Weight, 88lb.

For further details apply to Philips Electrical Industries Aust. Pty. Ltd., 69 Clarence-street, Sydney.

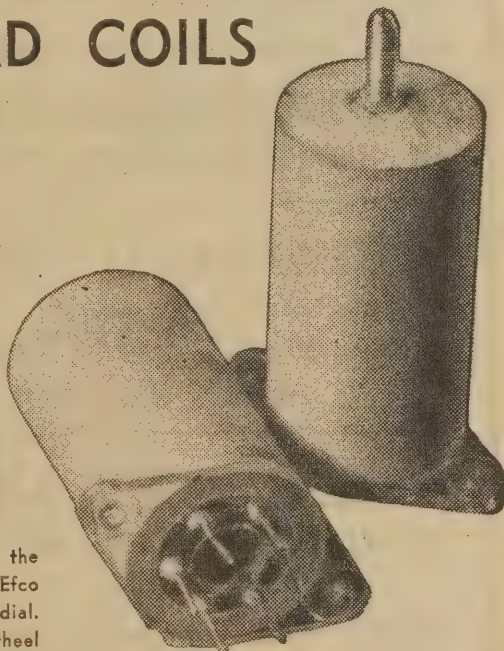
R.C.S. RELEASE IRON - CLAD COILS

RC'S RADIO have just announced a new line of "Magnasonic" iron-clad coils. The usual aluminium shield can is replaced by a moulded shell of natural magnetite, with an outer conducting bronze spray. The shell and spray shield is connected to a base pin for earthing purposes.

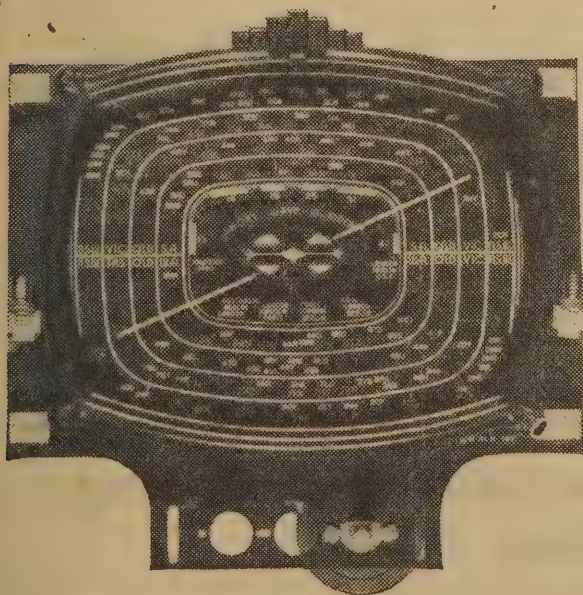
A feature of the coils is their moderate size and ease of mounting. The overall height is 2 3/16in. and the diameter of the can is 1-inch. The coils have variable iron slugs but these

are preset and cemented at the factory for correct inductance. It is intended that the coils be used with a variable padder condenser.

Apart from the aerial, RF and oscillator coils, RCS have released IF transformers in the same cans. These employ variable slug tuning. A feature is that the adjusting screw operates in a brass nut which is moulded into the



EFCO CD-31 DIAL



Illustrated here is the newly released EfcO CD-31 tuning dial. Employing a flywheel and cord drive, the dial pointer has a 180 degree rotary movement. The dial glass is edgelit and available for the "H" gang with either broadcast or short-wave calibrations. Alternative mounting positions are available for the spindle and the overall dimensions are 10 inches by 9 inches.

material, thereby obviating slipping or binding. The adjustment is easy enough to permit use of a plastic tool and sealing as accomplished by running trol cement into the threads of the adjusting bolt.

For midget receivers, the coils are available in moulded cans of the same 1-inch diameter, but approximately half the height.

The coils can be mounted through valve holes, with the trolitul base either above or below the chassis. The pins are pre-tinned to facilitate soldering and to avoid the necessity of applying excessive heat during the wiring process.

The coils and IF transformers are being released through all RCS distributors.

BARGAIN LIST!! SPECIALS!!

From **RADIO MART, 439 Pitt Street, Sydney**

HEADPHONES 2/- Each

SINGLE UNIT. BRAND NEW

MICROPHONES 3/6 Each

AIRFORCE MODEL

MICROPHONES 7/6 Each

DOUBLE BUTTON WITH SWITCH

TELEPHONE PANELS 5/- Ea.

RELAY, RECTIFIER, LAMP

4 CORE WIRE 6d. 4 FEET

RUBBER COVERED IDEAL SPEAKERS

GENEMOTORS 12 Volt Input

240v. 40 MILL. **50/- ea.**

320v. 40 MILL.

500v. 50 MILL. 90/-

MILLIAMETERS 0-50

SMALL SQUARE PANEL MOUNTING
INTERNAL SHUNT 15/- EA.

VALVES

EF 50

EF 39

6K 7

AV11

10/-

EA.

**I.F.F. Complete
with Valves**

U.H.F.
TRANSCEIVER

£5

AMPLIFIERS 20/-

2 VALVE BATTERY OPERATED
TRANSFORMER-COUPLED IN METAL
BOX. 2 VOLT VALVES (ENGLISH)

Emergency Transmitters 12/6

U.H.F. BRAND NEW WITH 1.4v.
VALVE

Miniature Morse Keys 2/- Each

STANDARD ARMY PATTERN 5/-
VERY HEAVY NAVY 5/-

HI VOLTAGE CONDENSERS

2 MFD 1000 V WKG 7/6

1 MFD 1000 V WKG 3/-

1 MFD 1500 V WKG 7/6

.5 MFD 4000 V WKG 10/-

.25 MFD 2000 V WKG 3/-

SPEAKERS 5" PERMAG

BRAND NEW
MADE BY
SPARTON

19/6 ea.

SPEAKER TRANNIES 9/6

WIRE WOUND POTMRS.

20,000 OHM 1/6 EA.

$\frac{1}{4}$ MEG CARBON 1/6 EA.

2,500 WIRE 1/6 EA.

**NOTE—Special Offer Packing and Postage
on all above Lines FREE!!**

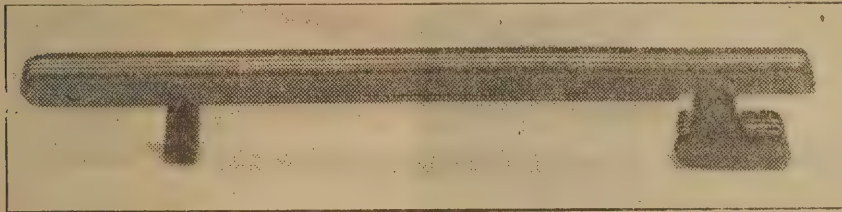
NEW AUSTRALIAN PICKUP

WE have had opportunity, during recent weeks, of trying out a new Australian crystal pickup. Release of this pickup is officially announced in an advertisement elsewhere in this issue.

The new pickup has simple but modern lines, the arm being a straight-

The chuck can utilise any standard playing needle, which is held by the usual locking screw. Weight on the needle point is moderate.

Tested with a typical amplifier, the new pickup gave excellent results and was at least equal to or better than comparable imported types. The output is high and well sustained in the treble register, apparently tending to



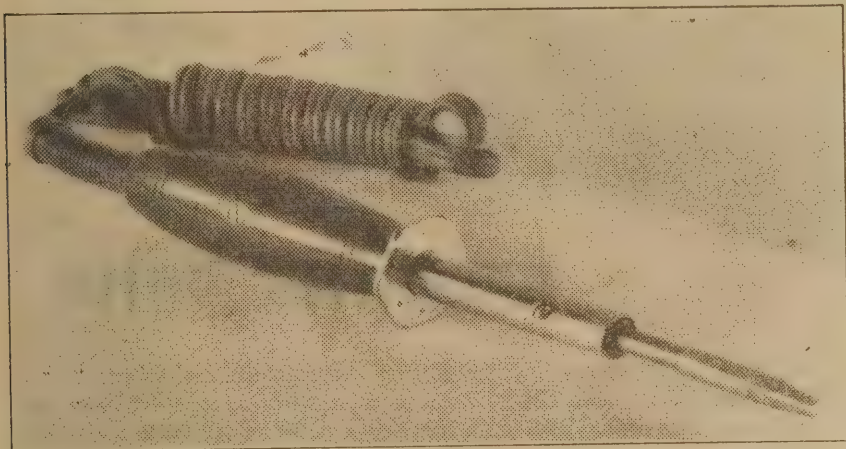
pressing approximately $\frac{3}{16}$ in. wide by 10 in. long. It is finished in black crackle lacquer, with a lengthwise plated strip to add finish. The base and rest continue the same motif. Single-hole mounting is employed.

Although the arm is straight the crystal unit is actually offset within the arm to minimise tracking errors.

a broad peak at about 8000 cycles per second. This lends a sense of brilliance to the reproduction from commercial pressings, which balances well the sustained bass response.

The manufacturer has plans to release also a crystal microphone, which should be of considerable interest to amateur transmitters.

A QUICK HEATING SOLDERING IRON



G. H. Macarthur and Co. have introduced this 17-watt quick heating soldering iron, operating from a 6-volt supply. Only the tip heats, and the iron is ready for use within 90 seconds of switching on. The outer shield remains cool, so that the iron needs no rest and it can be handled like a pencil for fine work. The "Icon" iron, as it is known, is being distributed through all wholesalers. Manufacturer's address is Box 3893 GPO, Sydney.

PRACTICAL WIRELESS ENCYCLOPAEDIA

REPRINTED recently in Australia, "The Practical Wireless Encyclopaedia" contains a wealth of information for experimenters. Compiled by F. J. Camm, the book has a definite English flavor, but most of the information is universal in its application.

In keeping with the title, the subjects are introduced alphabetically, the definitions varying in length from a few lines to several pages. Thus, right in the front of the book, is a section on accumulators which takes in some 30 pages. The author explains the various types of accumulators, their method of operation, troubles and re-

pair methods, and charging arrangements from various sources. This even develops into a discussion of wind-chargers!

There are similar long sections dealing with chassis, coils, circuits and a variety of other subjects as they occur in alphabetical order.

The book contains some 394 pages and nearly 500 line drawings and circuits to illustrate the text. In short, it is the type of book which will hold an absorbing interest for beginners and younger enthusiasts, with its helpful admixture of theory and practice.

Published in Australia by Dymocks, the book is available from technical booksellers at 12/6, plus 6d postage.

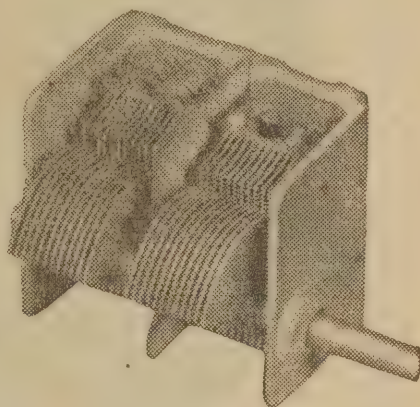
KINGSLEY LOUDSPEAKERS

MUCH interest has been shown by the trade in the samples of Kingsley reproducers shown recently in Sydney and Melbourne. The first of the range of Kingsley speakers is a six-inch model, Type R-6.

The Kingsley Type R-6 reproducer employs a high-grade Alnico magnet. It is equipped with transformer and can be supplied in a variety of impedances. Filter chokes are available if required.

Windings of the transformer and the filter chokes are contained in pre-moulded bakelite formers, ensuring good insulation and freedom from breakdown of winding to frame.

The bracket on the speaker for mounting in table models is also designed to accommodate the filter choke when the speaker is used in a console



Another new Kingsley product is this miniature 2-gang for small portable receivers. Overall dimensions, with the plates open but not including the spindle, are approximately $2\frac{1}{2}$ " x 2" x 2".

cabinet, thereby saving chassis space.

The cone movement is dustproof and the die-pressed steel frame is cadmium plated.

To prevent foreign bodies, such as metal filings, adhering to the magnets, a special air-conditioned department was set up in the factory. Excellent fidelity characteristics are claimed.

The remainder of the Kingsley speaker range comprises a three-inch model, to be followed at short intervals by a five-inch model and then a 10-inch model.

Philips Valve Data Chart

AS mentioned in the last issue, Philips Electrical Industries, Aust. Pty., Ltd., have released a wall chart giving electrical characteristics and socket connections for valves of recent manufacture, or projected for the coming season.

These charts are free on application to the head office of the company or by post. Note that the box number is 2703, GPO, Sydney, not 2730 as given in the last issue.

RADIO'S MOST REMARKABLE "BUY"



PHILIPS

Type 1604

and

Type 1608

Amplifier Units

Here are two Amplifier Units that will be a real "find" for every radio enthusiast.

Type 1604, with an output of 4 watts, has a single 6V6G audio tube, while type 1608, with an output of 8 watts has two 6V6G valves in parallel. Both units require a drive of 21 volts and each has its separate power rectifier.

The units are identical externally, housed in a compact, metal cabinet only $8\frac{1}{4}$ " x 8" x 5".

A number of uses, besides the applications listed below for these units, will be apparent to any radio man.

Five Applications for PHILIPS Amplifier Units

- For use with broad band tuners for high quality radio reproduction
- For use as booster audio-system for existing equipment
- For use as modulators for low power radio transmitters
- Easily modified for the amplification of recordings
- For low power paging systems.

Type 1604
£7/10/-

Type 1608
£8/10/-



PHILIPS

AMPLIFIER UNITS

PHILIPS ELECTRICAL INDUSTRIES OF AUSTRALIA PTY. LTD.

Sydney • Melbourne • Adelaide • Perth • Brisbane

Q34-47

THE FIRST 2-ENGINEED HELICOPTER



THE world's largest and first twin-engine helicopter, a sensational step forward in the development of rotary wing aircraft has been announced by the US Navy.

Known as the Navy's XHJD-1, the first twin-engine helicopter to fly was designed by the McDonnell Helicopter Division (C. L. Zakhartchenko, Chief Engineer) in collaboration with the Bureau of Aeronautics of the Navy.

Experimental flight tests have been conducted at Lambert—St. Louis Municipal Airport for the past few months.

The new XHJD-1, in common with other helicopters, takes off and lands vertically, hovers motionless, flies forward, side-ward and backward.

Two 450hp. Pratt and Whitney Wasp Jr., engines power the craft's two lifting rotors which are arranged side by side.

The big 40 foot blade rotors turn in opposite directions, making a tail or torque rotor unnecessary.

The span from rotor tip to rotor tip is 81 feet.

Late this month test flights will be made with 46 foot diameter rotors, with an overall span increased to 87 feet.

The use of twin-engines gives the XHJD-1 greater reliability for safety over rough terrain, populated areas, or water.

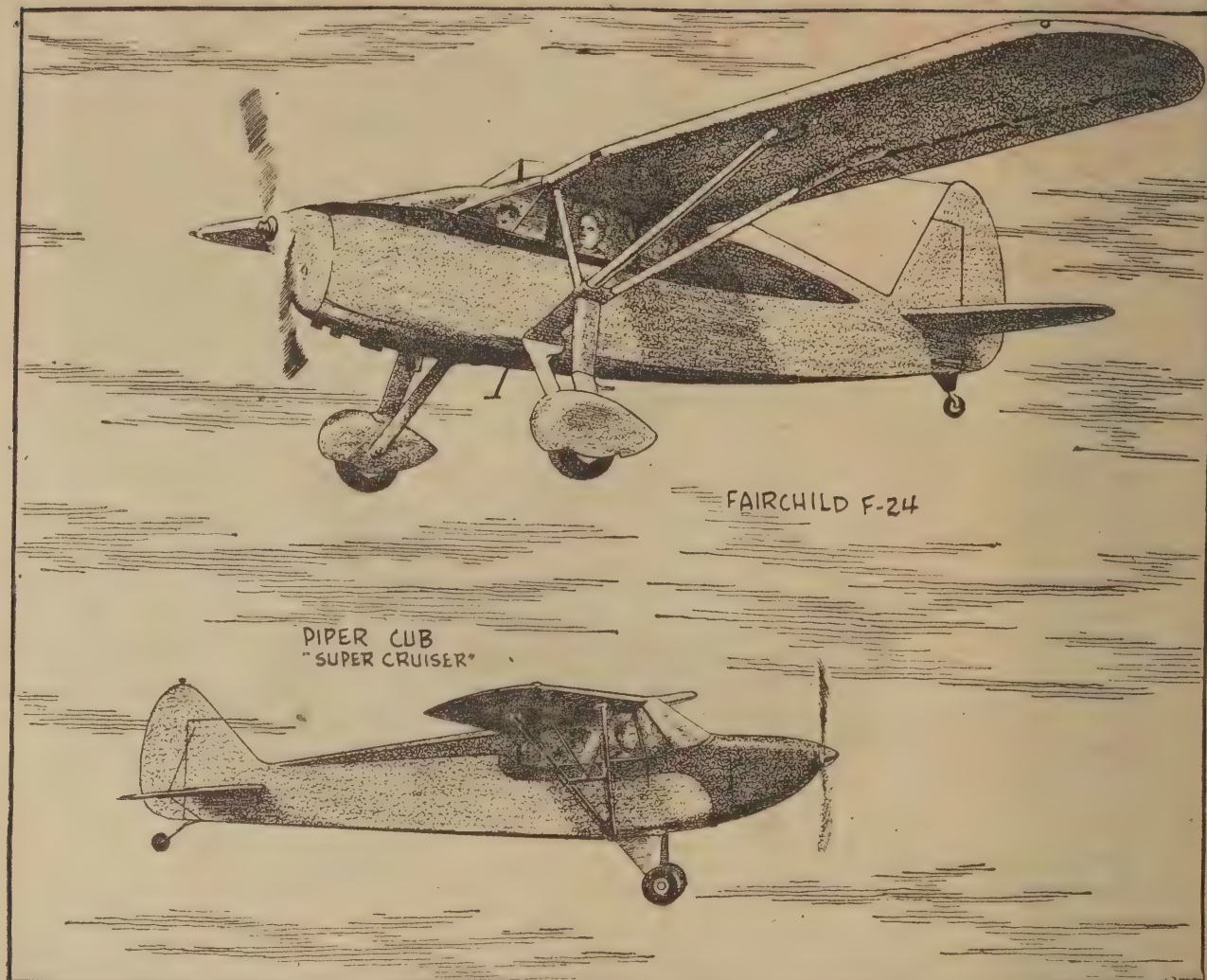
The helicopter will cruise at more than 100 miles per hour with a useful load of more than 3000 pounds.

The Pratt and Whitney engines are mounted midway on the pylons extending from the fuselage out to the rotor hubs.

The XHJD-1 will fly on either of the two engines; either engine is able to drive both rotors through a system of over-running clutches.

Without power, the rotors will auto-rotate and the craft can glide to earth in somewhat the same manner as a fixed wing aeroplane.

"FLY-YOURSELF" PLANES POPULAR



FAIRCHILD F-24

PIPER CUB
"SUPER CRUISER"

"Fly-yourself" planes are becoming popular in the United States, where new types are being added to the many designs created to meet the needs of the private light-plane flier. Factors that have contributed to the growing popularity of "personal" planes are the growing safety and comfort of the light plane, and the great number of Air Force men who during the war looked to planes as the logical means of transport in this modern age.

LIGHT planes offer an excellent means of travel from city to small towns, or between towns or outback stations. For holiday jaunts or urgent business missions, these planes are indispensable in saving time. They are an excellent means of transportation for travelling salesmen and others, who are called upon to do much cross-country travelling.

Sketched here are two attractive little easy-to-fly aircraft now being turned out on a mass-production scale in the United States.

The Fairchild F-24, built by the well-known American aircraft firm of Fairchild Corporation, has been designed to fill three main roles — as a personal

transport for business executives, as a pleasure craft for sportsmen, and a de-luxe family plane.

A four-seater, the F-24 is a braced high wing monoplane with fixed landing wheels. Flaps and wide-gauge undercarriage assure slow, safe landings.

LUXURIOUS INTERIOR

The interior is luxuriously appointed, with plenty of leg-room in the deep-cushioned, four-place cabin. Luggage can be stowed in a roomy compartment behind the rear seat.

Low maintenance costs and economical performance are claimed. Top speed is 133 miles an hour, and at 75 per cent. of rated power, cruising

speed is 118 miles an hour. Range is 620 miles.

The plane is designed to attract charter pilots and small airlines as a utility of outstanding performance.

Well known over many years for its sterling qualities, the Piper Cub has reappeared as a personal plane after years of military service. Sketched here (below) is the three-place Piper Cub "Super Cruiser."

Offering fuel consumption that is lower than that of the average American motor car, the Cub is a high-wing braced monoplane with fixed undercarriage.

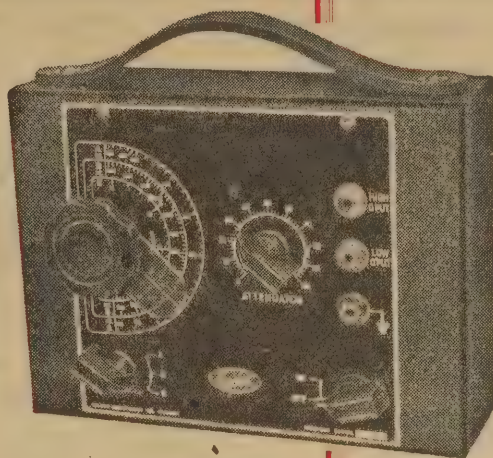
In war, the Cub was a maid-of-all-work. Piloted by officers and men who

(Continued on Page 83)

NOW AT LAST YOU CAN—

Build Your Own Oscillator!

Here's the kit you've waited for—an oscillator kit which covers all the fundamental frequencies necessary to line up the modern receivers.



EASY TO CONSTRUCT WITH ORDINARY TOOLS

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"University" pioneered oscillator kits and many are still in use. Model OKI is a companion to our famous multimeter kit model MKI and they make a handy pair—readily portable and easily built. The OKI oscillator operates from built-in bat-

teries and these batteries are standard types that may be easily purchased everywhere.

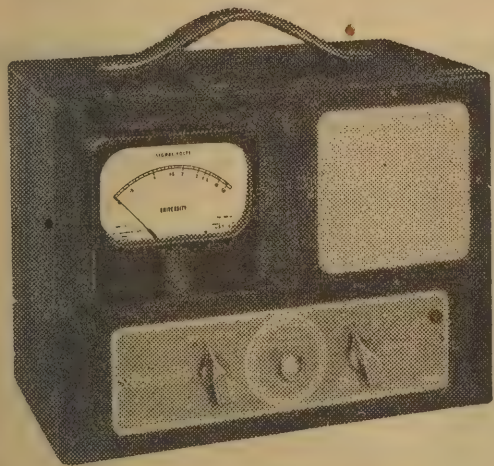
PRE-CALIBRATED DIAL

The "University" OKI oscillator kit comes to you with a completely calibrated dial which is pre-calibrated in the factory before going out in kit form.

This means that when you construct according to directions you have a calibrated dial off which frequencies can be read direct. Most home-builders' kits in the past have had an ordinary 0/100 dial which limited the effective use of the oscillator.

Available from all distributors, the OKI oscillator will be in ready demand. It is available to you at a new low price with everything included, right down to the last nut and bolt. Order your model OKI to-day!

PRICE £7/10/0 (plus tax)



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PICTURE NEWS OF THE WORLD'S SKYWAYS

Successor To DC-3

A new twin-engined commercial transport, designated the DC-9, has been proposed by the Douglas Aircraft Company as a successor to the DC-3.

Slightly larger than the famed DC-3, the new aircraft is a conventional, low-winged monoplane with retractable tricycle landing gear.

It has a span of 101 feet (aspect ratio of 12), overall length of 70 feet eight inches and height of 26 feet.

The DC-9 is powered by two 1475 hp Wright Cyclone R-1820 engines driving 13-foot reversible Curtiss electric propellers.

It carries 28 passengers and has a cruising speed of 257 miles an hour, and an absolute range of more than 2400 miles.

The new plane is pressurised and includes all the modern electronic flight and navigation instruments, including radio altimeter, dual radio compass, glide path and localiser indicator.

Hughes Boat In News

The Hughes Flying Boat, largest aeroplane in the world, designed and built by Howard Hughes for the US Government, is going "indoors."

Its millionaire sponsor is again in the world's news, together with his part-built production.

More than an acre and a half of canvas, placed on a tubular steel frame over the entire ship, will protect workers busy in readying the sky giant for its launching and provide a covering whenever the flying boat is in dock.

The complicated frame is designed with cantilever trusses projecting over the wings and horizontal stabilisers, and with hoops enclosing the towering vertical stabiliser.

To allow clearance for this stabiliser when the ship moves out of its special dock, the canvas will be rolled toward the sides, and the centre pipe columns will be lifted from their sockets.

The Hughes Flying Boat's great "tent," 77,450 square feet of 16-ounce fireproofed canvas over 84' tons of tubular steel, is expected to be completed in a few weeks.

So far, a date has not been set for the launching of the huge craft.

T.A.A. Sets Figures

A new commercial flight record was established by a Trans-Australia Airlines Douglas DC-4, which flew from Burbank, California, to Melbourne in 38 hours 10 minutes.

A wireless message from pilot J. B. "Tommy" Chastain said he had clipped 30 minutes from the previous record set on October 4, 1946, by another TAA DC-4.

Both planes flew via Honolulu, Canton Island, Noumea, and Fiji Islands on the delivery flights.

by

Boris Carone

Records Review

The International Aeronautical Federation has appointed representatives from Britain, France, and the United States for a committee to consider alterations of rules governing world records.

A proposal relating to speed records was put before the FAI by the Royal Aero Club.

It was suggested by the club that instead of covering four laps (two in each direction) over a course of 1.3 miles, in future records should be attempted over two laps (one in each direction), over a six-kilometre course.

At present world speed record attempts are officially observed by representatives of the National Aero Club of the country, making the attempt on behalf of the FAI.

It was proposed that for subsequent attempts there should be observers from another country present.

For long distance non-stop flights it was suggested that the planes be permitted to make two changes of course, instead of the one at present.

Radiograms In Flight

Aviation history was made recently when passengers aboard the Trans-Australia Airline's Skymaster, McDouall Stuart, on a charter flight to Auckland NZ, sent private radiograms from 10,000 feet above the Tasman Sea.

These were delivered to addresses in Australia through the usual telegram channels.

It is hoped within a few weeks all TAA passengers travelling between Melbourne and Perth will be able to send private telegrams to ground destinations while in flight.

Negotiations with the postal and radio authorities have been in progress for some time.

Trans-Australia Airlines also experimented with the use of telephones for passengers from the air to the ground.

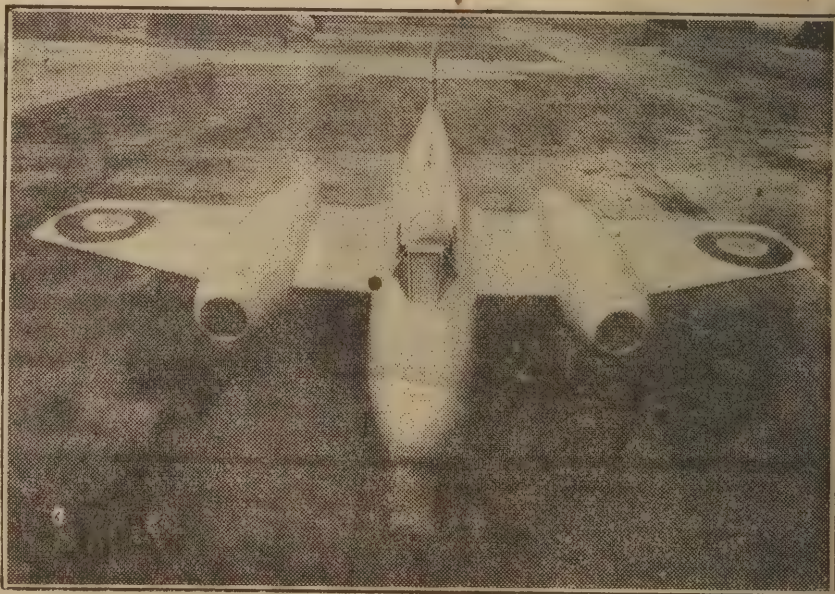
Recently the wife of the TAA operation manager answered her telephone in Windsor (Vic.), to find she was talking to the captain of a TAA Skymaster.

What she did not realise immediately, because of the clarity of the conversation, was that it was coming from 8000 feet from an aircraft 100 miles out of Melbourne.

It took less than five minutes from the time the call was booked to the time it was answered.

Mr. J. L. Brain, general manager of TAA, predicts that within a short time telegrams and telephone service would be available to all TAA passengers in flight on all routes.

LATEST GLOSTER HAS CLIPPED WINGS



This latest "clipped wing" version of the Gloster Meteor is to become the standard design for future production. Its wing span has been reduced from 43ft. to 37ft. Although its manoeuvrability is greater than the Mark IV its maximum level speed is 5 mph slower.

THE STRENGTH OF MODERN AIRCRAFT WINGS



Twenty-eight Luscombe employees demonstrate the strength of the new all metal wing of the Luscombe Silhouette. Note the tyres, which went completely flat under the load of over 3500lbs.

High Speeds In U.S.A.

Two aircraft of Republic Aviation Corporation, representing the extremes between single-seater, single-engined jet-powered fighter craft on one hand and a large, long range, four-engine transport type plane on the other, set up new unofficial speed records from New York to the Philadelphia World Air Show at Philadelphia's North-east Airport.

Clocking over the New York City Hall, a Republic P-84 Thunderjet sped the 72 miles to North-east Airport in seven minutes and 10 seconds, finishing at 615 mph.

Speed for the course averaged 588 miles per hour.

A little over an hour later, a Republic four-engined XF-12 Rainbow flew from La Guardia Field to North-east, an airline distance of 76 miles, in 11 minutes and 45 seconds.

The XF-12 flight averaged 405 mph, despite the fact that it was made at relatively low altitudes.

Both the P-84 and XF-12 flights were clocked either by military or airport control tower timing for the New York City Hall, and the La Guardia Airport check points to the time of passing over the operation-room at North-east Airport.

The P-84 which made the run had been completed and test flown on the morning of the day the speed test was made.

The P-84 is now being groomed for a new attempt at the world's speed record this summer, USAAF officials recently announced.

Citizens Use Jato

The Aerojet Engineering Corp., of Azusa, California, may offer JATO (jet-assisted take-off) for personal aircraft within the next three months.

Experimental test stand runs of a 250-pound thrust JATO rocket show that it has a duration of 14 seconds.

It is now being made, and flight tests with a BT-13 are expected to begin shortly.

The production prototype is expected to weigh about 39 pounds.

The new unit will be identified as Aerojet's "Baby JATO," for contrast with the company's recently certificated transport JATO engine, which weighs 250 pounds and has a 1000 pounds thrust over a duration of 13 seconds.

CAA certification of the JATO engine has resulted in world-wide inquiries from air-transport companies and personal aircraft owners.

The first foreign orders came from the Swiss Air Force, who will conduct tests with JATO.

Vought Corsairs, the swift gull fighter planes flown by US Navy and Marine Corps pilots, shot down a total of 2140 enemy aircraft in World War II with a loss of only 139 Corsairs in air combat.

The figures, which represent a victory ratio of more than 11 enemy planes down for every Corsair lost in air battle, are based on information obtained from the Office of Naval Intelligence.

They cover a period from February,

1943, when a handful of the early F4U-1 Corsairs took off from Guadalcanal airstrip until V-J Day when hundreds of newer Corsairs with greatly increased armament and performance and based on aircraft carriers and airfields within easy range of the Japanese home islands, helped bring the war to an end.

Enemy air power was at its peak when the Corsair, as a land-based fighter, struck its most telling blows.

Marine Corps fliers led the onslaught, shooting down 1400 enemy planes while operating from island airstrips.

Of the total downed, 1100 were fighters and 300 bombers.

The marines' air losses were 141 Corsairs shot down.

A small number of Navy Corsairs meanwhile, accounted for 162 enemy planes with a loss of 14 of their own aircraft to give a final tally of 1560 enemy craft destroyed by land-based Corsairs against 155 F4U-1's lost in battle.

Later, after being assigned to aircraft carriers, Corsairs shot down 578 enemy planes with a loss of only 34 F4U's.

Navy fliers brought down 360, of which 260 were fighters and the remainder bombers, while marine pilots downed 218, including 159 fighters and 59 bombers.

During the war, Corsairs carried out a total of 65,051 action sorties against such targets as enemy airfields, road transportation, harbor areas, warships and other military objectives.

Of this total 54,470 were flown from land bases and 9581 from the decks of aircraft carriers.

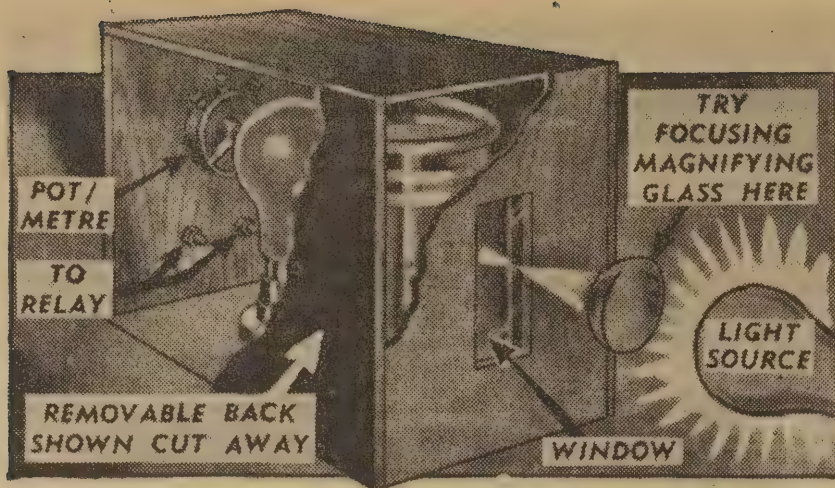


Fig. 5—The complete electric eye is fitted as shown here.

when light from an 80-watt lamp is directed on one of the plates or "electrodes."

Two thin copper plates, each measuring about 4in. by 1½in., form the electrodes; to these are soldered short flexible leads. Ebonite strips, about ½in. by 1½in., space the plates at top and bottom; rubber bands support the assembly. This is placed in a clear glass jar or tumbler, and a solution made with copper sulphate 33 grains distilled water, 3oz., added to the level of the top ebonite spacer. The cell is now complete, but before use should be placed in a dark cupboard for at least two days.

PRACTICAL APPLICATIONS

It is suggested that a wooden box be made to house the completed cell; this should be light-tight save for a front slot measuring 1in. by 3in. to ex-

A SIMPLE PHOTO-ELECTRIC CELL

MANY interesting experiments may be conducted with the easy-to-make chemical "photo-cell" to be described. Although inexpensive to make, the cell is quite efficient and passes a current of several microamps

pose one plate. Constructional details are given in Figs. 1 and 2.

If the photo-cell is connected in series with a neon lamp and battery, light from a 40 or 60-watt lamp falling on the exposed plate causes electrons to flow to the opposite plate, the cell becomes conductive and the neon lamp

(Continued on Page 93)

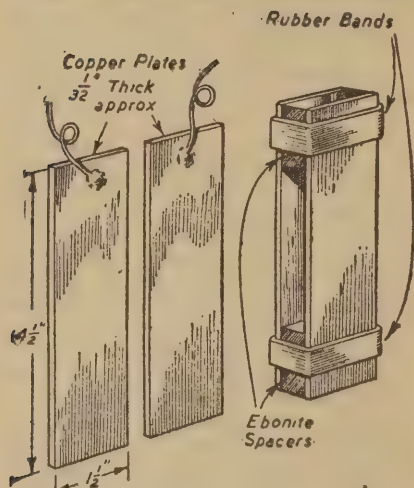


Fig. 1—Dimensions of the plates and method of assembling the principal parts of the cell.

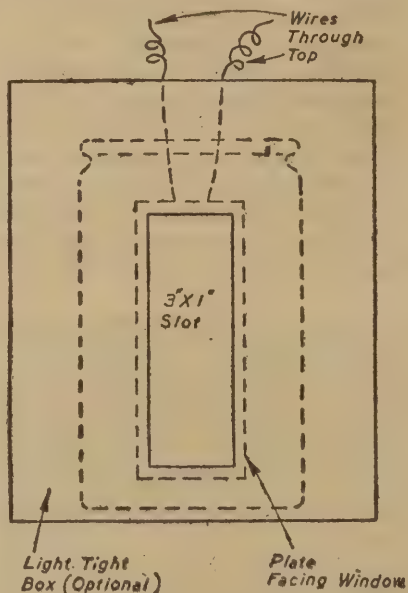


Fig. 2—The completed cell is mounted in a light-tight box in the manner shown in the diagram.

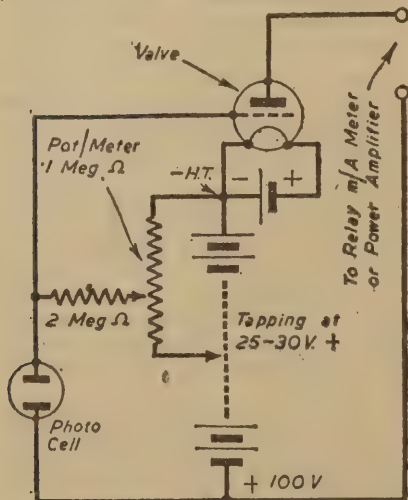


Fig. 4—A circuit arrangement to increase the power of the cell and enable various apparatus to be operated.

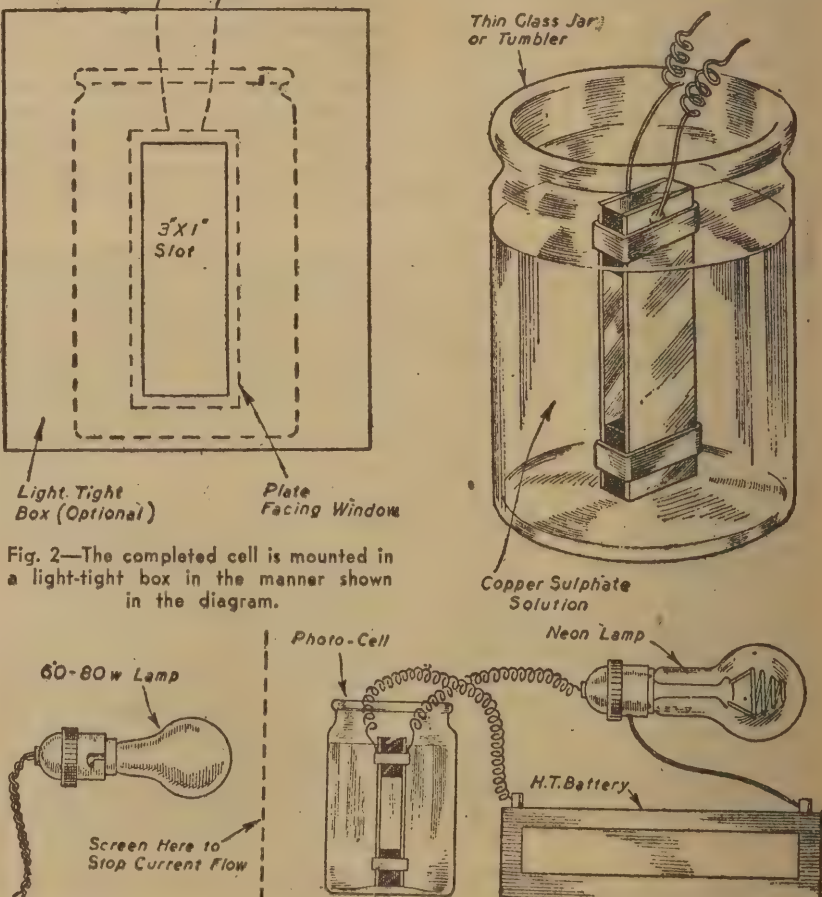
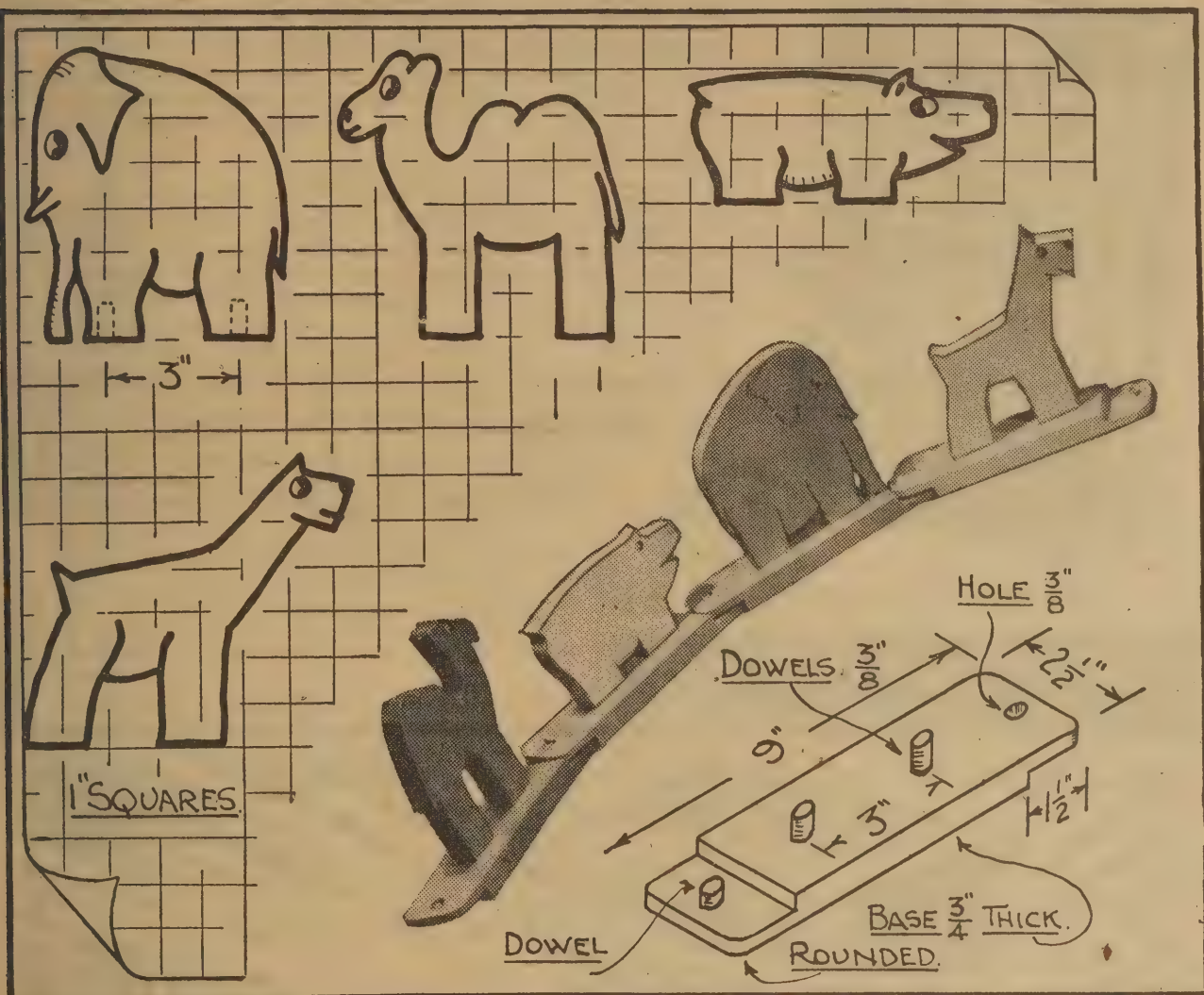


Fig. 3—The complete arrangement of the photo-electric cell for light experimentation.

HOW TO MAKE THIS ANIMAL TRAIN



Another example of the pull-along and take-apart toy for the tiny tot is the animal train illustrated in both the sketch and the photograph. Each individual piece is of a suitable size for young fingers, and have pleasing and easily recognisable shapes. The animals and bases are interchangeable so the units can be positioned at will. If desired a string may be attached to the leading section.

CONSTRUCTION is very simple and depends a great deal on getting suitable stylised shapes for the animals. Four varieties are suggested, but no doubt many others will be found by the enthusiastic craftsman.

After collecting the designs, make a start on the construction of the animals, which should be made of light, straight-grained wood, $\frac{3}{4}$ in. thick. A piece about 12 inches square will make the four figures shown. Plane up both faces of the timber and mark out one-inch squares on one of them, then copy the shape of the animals suggested above. Have the grain going in that direction which will give the greatest strength. This is very necessary where there is a long neck or other thin part. Also, be particularly careful in setting out

the legs of each at 3 in. centres because two holes have to be drilled in each animal which will then fit on to two corresponding pegs on the base. Cut the animals to shape, which is easily done with a fret-saw and carefully drill the holes in the legs.

BASEBOARDS

A base similar to that shown in the detail in the bottom right-hand corner of the sketch is needed for each ani-

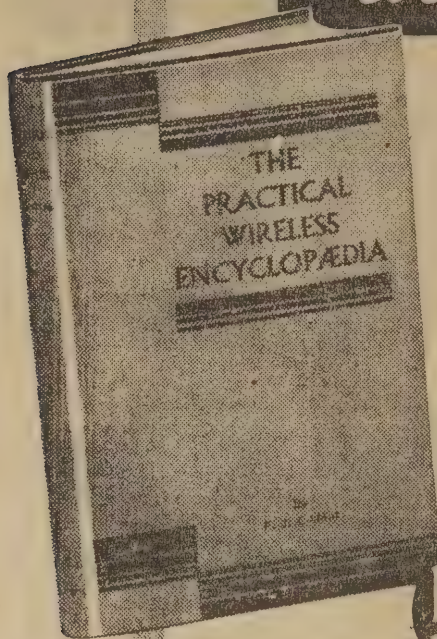
mal. For these, first obtain four blocks of wood each $9 \times 2\frac{1}{2} \times \frac{3}{4}$ in. and plane up all sides, edges and ends and round the corners at about 1 in. radius. Do this latter paring with a sharp chisel and cleaning up with a file. Then draw the centre line lengthwise down the blocks and accurately mark out the positions of the holes. The two middle ones must be exactly 3 in. apart to correspond with the holes in the legs in the animals. The other two are $\frac{1}{2}$ in. from each end. It is a good idea to make a template to help in this setting out, or better still, if a power drill is available, clamp the pieces together and drill all of the holes at the same time.

Further, notice that the ends of each base are stepped, one up, and one down, so that they may overlap in joining. Measure 1 in. from each

(Continued on Page 81)

by T. E.
Le Sueur

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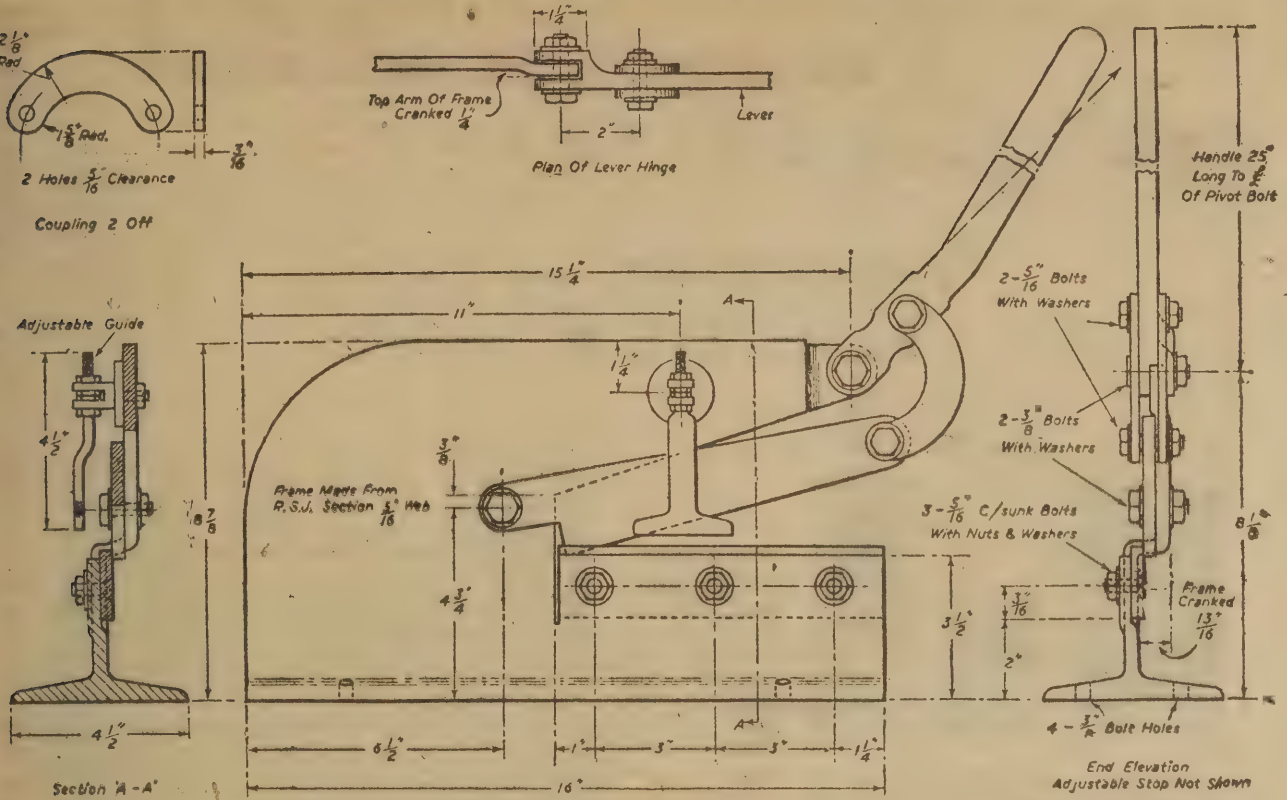
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THERE ARE MANY USES FOR THIS SIMPLE GUILLOTINE



THE small bench-guillotine, shown in the accompanying illustrations, was made entirely from scrap material with the aid of a small portable forge and a few hand tools. The main frame is made from R.S.J. section with 5-16in. web, the cutting blade being finished to the shape required from a piece of scrap motor spring.

It will be noticed that the operating lever is bifurcated at its lower end for attachment to the upper arm of the frame, the lever being connected to the end of the movable blade by two curved connecting links. An adjustable guide is provided and, if necessary, packing can be used between the

frame and the fixed blade to line up correctly with the movable blade. Holes, 3/4in. diameter are drilled in the flange of the foot of the main frame for bolting to a base plate. The guillotine is capable of shearing metal up to 1/4in. mild steel plate.

HOW TO MAKE AN ANIMAL TRAIN

(Continued from Page 79)

end and on opposite faces mark a line across with your try square. Set a marking gauge to half the thickness of the timber and gauge where necessary, along the edges. Saw out the waste pieces and finish off the rough places with a chisel and sandpaper.

CENTRE PINS

Three pieces of 3/4in. dowel are glued in the base. The centre pins for the animals need to be 1 1/2in. long, and that for the connecting link 1in. long. Glue these and tap them into place after rounding off the top ends.

Now try out your animals and bases for fit, making any small adjustments that may be necessary by cleaning out the holes and sandpapering the pins. You will also probably find that the bases will move more freely if the link hole is enlarged to about 7/16in. diameter.

When satisfied that the parts are interchangeable and slip together easily, prepare for the painting. Much of the appeal of this type of toy depends on bright coloring, so choose your color scheme carefully, using

glossy enamel in blue, green, red and yellow. Do not attempt to get a realistic effect with the painting, and it will be found that the plain color with large blue eyes and black pupils will be very striking. Carefully go around the outside with a fine black line and similarly paint in the other details. The bases are also painted in bright colors to match the rest of the toy.

Zero Landings Here

NEW landing system developed by Westinghouse Electric Co. will penetrate fog or snow up to 1000ft. altitude. The system includes four component parts: Approach lights, red and green "busy" lights, powerful runway lights, and approach-angle indicator. Approach lights extend two-thirds of a mile from start of the runway and are of two types. In one, a 4in. quartz tube of krypton produces 3,300,000 candlepower flashes. The other contains six neon lamps, burning steadily and producing 10,000,000 cp.

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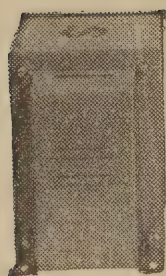
RED  LINE

EQUIPMENT

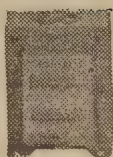
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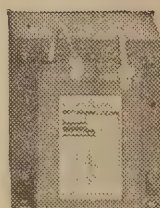
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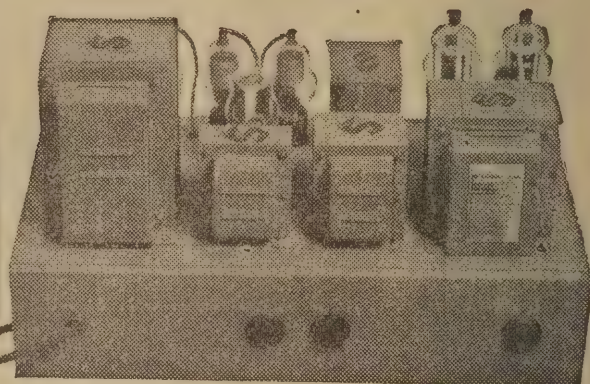
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A GUARANTEE

OF DEPENDABILITY

AMPLIFIER FOR HOME RECORDING

(Continued from Page 45)

sufficient to render the treble loss of no importance. The trouble is, of course, much less evident with a pentode valve, as normally used in our circuits.

As previously mentioned, the gain of the amplifier is quite high from the pickup terminals, and certainly ample for any ordinary pickup or radio tuner. In fact, we found that good output could be obtained from the pickup terminals by speaking closely into a high output crystal microphone. However, not all microphones are up to this standard, as far as output is concerned, and it is inconvenient to have to work so closely. The microphone stage therefore, takes the form of a straight pentode, which can be either a 6SJ7 or a 6J7-G. In fact, a simple triode stage would probably do for most purposes.

CONSTRUCTIONAL

From the constructional viewpoint, the amplifier was built on to a 17in. chassis and fitted with a 19in. front panel for rack mounting in the writer's station. The various pictures give a clear indication of layout. The chassis measures 17in. x 8½in. x 3in. and the panel 19in. x 8½in. The particular arrangement may not appeal to everyone, but we have assumed that anyone proposing to make recordings will be sufficiently familiar with constructional methods to lay out a chassis and wire it up correctly. For this same reason, we have not attempted to draw a wiring diagram.

The power transformer is at the rear corner of the chassis with the rectifier alongside it. Then comes the filter choke, which needs to be a good one for low hum level. The two filter condensers are alongside that again, and the other corner of the chassis is blank.

The preamplifier valve is in the corner remote from the power transformer. It is a good thing to bring all wiring to a common earth point for this stage. We were not so fussy in the original amplifier about this, as the chassis was made of aluminium, which is non-magnetic.

The tone control valve is alongside the preamplifier, then the voltage amplifier, the output valve and finally the output transformer. Note that this is mounted with the core and windings at right angles with those of the power transformer.

Viewing the front panel, the pickup and microphone jacks are at the left, with the two volume controls alongside them. Then comes the standby switch in the centre line of the panel, with the signal level meter above it. There is the treble control potentiometer, the bass response switch and a group of terminals for the various output impedances.

Underneath the chassis the wiring is quite straightforward and should present no difficulties for the experienced constructor. Make sure to mount everything firmly and avoid poor joints or the use of excessive flux, which might promote trouble with noise.

Keep the plate circuit components of the 807 clear of other wiring and shield the grid of the first three valves. If you use a valve with a top cap as the voltage amplifier, it is essential to slip a shield over the valve to prevent capacitive coupling to the 807 valve alongside.

There is really little else to be said about the amplifier itself. In a subsequent issue we may have something to say about the job of recording itself.

FLY YOURSELF PLANES ARE POPULAR

(Continued from Page 74)

(Continued from Page 74)
built up their flying time in civilian life, these rugged little planes were used in reconnaissance and liaison work, as mail-carriers and ambulance planes to operate from fields too small for other aircraft. In Europe, Cubs were fitted with Bazooka (rocket) guns, which were mounted in trios on each wing strut. The guns (which gave no recoil) could be fired either individually or in salvo.

The Piper Cub's amazing climb made it possible for the planes to take off from the deck of a LST (Landing Ship, Tank).

Because of its safe-flying and easy-

handling qualities, the Cub has been used very extensively as a training plane in the US.

The Super Cruiser has a double seat behind the pilot's position. The interior is upholstered in contrasting colors and there is excellent vision from the spacious windows.

Equipment includes dual hydraulic brakes and parking brake, steerable tail wheel, and compass. Navigation lights and battery are fitted, and an electric starter and two-way radio are available.

A floatplane version, the Sea Scout, is fitted with plastic plywood floats or metal floats, and can be quickly converted to a landplane by replacing floats with the regular wheel landing-gear.

The Super Cruiser version is fitted with a 100-horsepower engine. Overall length is 22ft. 6in., and wingspan 35ft. 6in. Up to 40lb. of luggage can be carried.

Landing speed is 45 miles an hour, and normal flying speed 110 miles an hour.

KIT SET SERVICE

If the circuit has been described in this issue or any earlier edition of "Radio & Hobbies," we can supply a complete building kit, right down to the last nut and bolt! Write, describing what you have in mind, and we will quote you for a complete kit of parts.

Even if you have had little previous experience of set-building, and don't know one resistor from another, or a padder from an electrolytic, the series of diagrams and instructions available without extra cost, will enable you to complete the set, provided you can use a soldering iron. When ordering, please indicate whether you require these instructions.

• For this month, we suggest the

LITTLE GENERAL,

Exactly as described in the August Radio & Hobbies. Complete kit, including cabinet, but without valves £9/10/0

Set of four valves available at £4/0/10.

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SHORT WAVE NOTES BY RAY SIMPSON

Davis Cup Broadcasts From Canada NEW OUTLETS FOR MANILA, COLOMBO

Thanks to the excellent service given by the Canadian Broadcasting Corporation the Davis Cup matches between Canada and Australia were heard very well in this country on the 8th, 9th, and 10th August. CHOL was exceptionally good, while CKNC was also coming in at remarkably good strength considering the frequency used. If the matches between Czechoslovakia and, we hope, the U.S.A., are heard as well as those against Canada, tennis lovers will have no reason to complain.

BOTH Manila and also Colombo have taken into use new channels, the first being a move by KZPI to 9500 kc and the other the opening of a new channel on 15,230kc by Radio SEAC. Art Cushen tells us that HCJB has now moved back to 6280kc from 6359kc, where it is, not as good as it was on the old frequency.

XENN MEXICO

We have just received a very nice letter of verification from station XENN, Radio Mundial, which operates on 11,780kc. from Mexico City. The letter, which was in Spanish, was sent by air-mail and in it the manager stated that they had been experiencing trouble with the electric supply but hoped to resume their transmissions in August and also that they would again be heard in this country. At the time of writing we have not heard them again, but they will probably be back on the air by the time these notes are read. Their address is Radio Mundial, XENN, c/o XEN, Rep. de Brasil No. 25, Mexico City, DF, Mexico.

RADIO MALAYA

The Engineering Division of the Department of Broadcasting, which operates Radio Malaya, advise in their letter of verification of their test programmes on 6120kc., which was mentioned in the August issue, that they would be carrying out further tests from this new transmitter. The times they expected to be on the air are from 5.30 pm till 6.30 pm and also from 11.30 pm till 12.30 am. Further reports on these test transmissions would be welcome and should be addressed to Radio Malaya, Engineering Division of the Department of Broadcasting, Cathay Building, Singapore, Malaya.

CKRX CANADA

Another example of how patient one must be when waiting for a verification is the recent one we received from CKRX, Winnipeg, confirming reception of their programme which we reported in March, 1946. It therefore took 16 months to receive this verification, but still it did arrive, which is the main thing. Their letter was quite brief and beyond con-

firmed the report did not say very much. This station is operated by the owners of the broadcast band station CKRC and their address is c/o Station CKRC, Free Press Building, Winnipeg, Man., Canada.

LITTLE AMERICA

Verifications from NAVE, the transmitter aboard the USS Mount Olympus, are now arriving in this country confirming reception of their signals when the ship was in the Antarctic last January. Their card is a humorous one, being in the form of a Christmas card showing penguins wearing US Navy caps looking through a telescope, and the like. The verification, which was signed by the electronics officer, stated that they were using a 5kw. transmitter working into an open doublet and at the time of reception they were at the entrance to the Bay of Whales in Little America.

YHN JAVA

Java has been prominently in the news during the past few weeks, and it is therefore interesting to know that verifications are now coming along from this well-known station. Although we believe that some New Zealand listeners have received verification direct from the station the only one we have seen is in the form of a letter from the Central Committee of Indonesian Independence in Brisbane. A few nights ago we heard Mr. Max Krumbek give a call from this station.

ALGIERS

Mr. Jones, of Gladesville, NSW, advises that he has recently received his verification from "The Voice of America in North Africa" which takes the usual form of a rather plain black and white card. Being an African it, of course, holds special interest and is a very welcome addition to his collection.

From the same country we received a letter of verification from Radio Algerie confirming reception of their 11,835kc. transmissions. They give their operating times as 4.30 pm till 6.15 pm (Sundays till 8 pm), 10.45 pm till 12.30 am, and 5 am till 10 pm. They are still being heard nicely opening at 4.30 pm.

A NEW STATION IN INDO-CHINA

INDO-CHINA. — We are indebted to the "Universallite" for the following item regarding a new station in Indo-China: A recent report by Mr. Paul Dilg (a well-known American listener) was acknowledged in a broadcast over Radio Dalat, and among other items it was stated that the identification slogan is "Tel Radio Dalat L'Emetteur." Announced frequencies are 7146 and 7538kc., and although Mr. Dilg has not heard, the first frequency he reports good signals on the second one. Their address is simply Radio Dalat, Dalat, French Indo-China. We note by Miss Sanderson's last letter she is hearing Radio Hanoi on 11,900kc. at 10.15 pm, in addition to the other outlet on 9470kc. The 11,900kc. outlet is inaudible at our location, and the 9470kc. one very poor level.

SWITZERLAND. — From the same publication we learn that the United Nations Radio at Geneva has been carrying out experimental transmissions on 9515kc. and that regular broadcasts were to begin in the near future. They state that reports on these transmissions

should be directed to Mr. Robert Nivelle, in Charge of Radio, Information Center, European Office of the United Nations, Geneva. The Swiss Broadcasting Corporation is now sending out a very nice folder showing its complete schedule of broadcasts. This brochure also shows a very pretty view of Schwarzenbourg, where its transmitters are located, also a short paragraph giving details of its many transmissions.

CHINA: From both Art Cushen and Miss Sanderson we have word of a new Chinese station, XMAG, Nanking. According to Art its frequency is 4275 kc though Miss Sanderson gives it as 4250 kc. Programme consists of AFRS broadcasts while at 11 pm the usual San Francisco news is given. The station finally closes down at 1 am. Another Chinese station reported by Miss Sanderson is XRRR in Peiping, which is now operating on 10,260kc. and can be heard there at quite good strength on most nights.

FLASHES FROM EVERYWHERE

JAVA. — Stations are plentiful in Java these days and according to Art Cushen transmissions from Batavia with news in English can be heard on 4960kc., 6175kc., 9555kc., 10,060kc., 10,380kc., and 15,145kc. The above news in English is given at 8.30 pm. In their transmissions to the USA, Batavia can be heard at 10.40 pm on PLO 9860kc., and PLU 11,440kc. When Batavia closes at 2 am they give the calls as PMI for 10,380kc. and PLR for 4865kc.

Indonesian Republic broadcasts can be heard on many different frequencies, including one in Hindustani on 4035kc. which is on the air till 4.10 am daily.

TRIPOLI. — This country is not heard very often and we are thus very pleased to publish an item sent to us by Miss M. Woods, of Geelong, Vic. This lady received a letter from a friend who is in the RAF and at present located in Tripoli asking if she could put him in touch with any amateur in Australia with whom he could make radio contact. His call letters are TINS and he uses 100 watts in the 14m band. The address he gave was RAF Amateur Radio Station, near Tripoli, South Africa, but this would be more correct if it were written as Tripoli, Tripolitania, North Africa. We hope some VK amateur will make contact with him soon.

JAPAN. — From both the "Universallite" and also Mr. F. J. Smedley we have details of the present Japanese short-wave stations. The Broadcasting Corporation of Japan is operating for the following purposes: (a) To send the programmes of the Armed Forces Radio Service from WVTR key station Tokio to AFRS network stations in Japan and (b) to send BCJ programmes from JOAK key station Tokio to network stations, and (c) to send BCJ programmes from JOAK to Japanese Repatriation camps in the areas of Taihoku, Shanghai, Chengchien, Peiping and Tientsin.

JAPANESE SCHEDULE

Schedule is as follows:

JOAK No. 1: Yamata 5kw. 1955-1400 GMT, JKC 7257.5kc.

JOAK No. 1: Nazaki 5kw. 1955-2215 GMT, JFK 2 4910kc.; 2225-0815 GMT, JFK 9655kc.

JOAK No. 1: Kawaguchi 300w 0825-1400 GMT, JFK2 4910kc.; 1955-2300 GMT, JO9H 3475kc.; 0800-1400 GMT, JO9H 3475kc.

JOAK No. 2: Nazaki 5kw., 2055-1400 GMT, JKA 7285kc.

JOAK No. 2: Kawachi 5kw. 2055-0745 GMT, JKG 9695kc. 0855-1400 GMT, JKG2 4930kc.

WVTR: Nazaki 5kw. 2115-1400 GMT, JKD 6015kc.

WVTR: Yamata 5kw. 2115-0845 GMT, JKE 9605kc.; 0855-1400 GMT, JKE2 4860kc.

JOAK: Kawachi 7.5kw. 2250-0815 GMT, JVV 15,225kc.; 0825-1400 GMT, JVV2 9505kc.

JOAK: Kawachi 5kw. 2250-0815 GMT, JVV3 15,235kc.; 0825-1400 GMT, JVV4 9560kc.

The above information should help to clear up the many conflicting reports as to call letters, &c., of the various Japanese stations now being heard and we are grateful for the above details, especially to Mr. Smedley, who obtained it direct from Japan. In addition to the above we have recently heard what is no doubt JLT, with all-Japanese type programme, operating on 6190kc. at 9 pm.

ANDORRA. — Listeners will remember that Radio Andorra used to advise listeners to send reports to Fremantle Overseas Radio Limited at 18 Park-street, Park Lane, London, but we have now received a letter from Mr. Ern Moore, of Brisbane, in which he encloses a letter from that organisation saying that they are no longer representatives for that station and advising that future reports should be sent direct to the station. Mr. Foster, of Mount Vincent, also told us the same thing, so it seems that the best way is now to send all letters direct to Radio Andorra, Andorra-la-Vieja, Principality of Andorra. This station does verify reports sent direct to them, so that is definitely the best way.

AMONG THE AFRICANS

This month our summary deals with the African stations and a very interesting bunch they are. In years gone by it was very hard to hear any of them, but now they can be logged at practically any time throughout the day or night.

FRENCH EQUATORIAL AFRICA.—The Brazzaville station FZL has now become very popular and is heard on quite a number of frequencies, the best being 11970kc with 9440kc and 9955kc also being heard well at most locations especially around 6.45 am when news in English is given. There are also outlets on 6025kc, 7000kc, 15595kc and 17530kc, which are heard at different times at from fair to good strength, depending on the listener's location.

FRENCH WEST AFRICA.—Another French colonial station is Dakar which has been heard at excellent strength opening at 5.15 pm on 11715kc, and a few months ago was also being heard in the 19-metre band on a frequency of 15390kc in the early hours of the morning. This has always been rather a hard station to obtain verifications from, but recently they seem to be arriving in this country. Prior to opening at 5.15 pm on 11715kc the station plays three notes repeated for nearly 15 minutes, which is an easy way to identify the station. There is also another frequency, 6917kc, but we do not think this one is in use at the present time.

MOZAMBIQUE.—The stations operated by the Radio Club of Mozambique have always been popular, as they send out a very attractive card in answer to reports. Just now you can hear CR7BV on 4925kc at 6.30 am with excellent recordings and announcements in English. Earlier in the morning there is CR7BJ on 9645kc and also CR7AB on 3490kc, plus its harmonic on 6980kc. Other ones which have been heard are CR7BU on 4973kc, CR7AA on 563kc, 6138kc, 6170kc, CR7BE 9710kc, and CR7BD on 15230kc. Another Mozambique station which is reported as closing at 8 am is CR7IB in Beira which is operated by the Aero Club of Beira.

ANGOLA.—This is another of the Portuguese African colonies, and although there are not as many s.w. stations, as in Mozambique, one can still tune in at least one of them and that is CR6RA on 9470kc, and which is located in Luanda. This one closes just before 7 am with a rather weak signal. Others listed in this country are CR6RF in Benguela, using 7054kc, while another in the same location is CR6RB on 9165kc and this one has definitely been heard over here and also verified by Rex Gillett. Another outlet of the Luanda station is CR6RN, operating on 15900kc, which we believe is on the air at the same time as CR6RA. Years ago we verified an Angola station CR6AA, which used to operate on 7177kc.

SOUTH AFRICA.—There is quite a number of stations operated by the South African Broadcasting Corporation, mainly from Johannesburg and Capetown. At the present time the easiest of these to log is Johannesburg on 9870kc, which is heard fairly well till closing at 2.10 am. Another Johannesburg station operates on 3450kc, and at some locations is audible till closing at 7.5 am, as also is the Capetown station on 5883kc. On occasions one can also log Johannesburg on 6095kc around 7 am, but the interference is rather bad at that time. Other outlets are Johannesburg 4373kc, 4995kc, 6007kc, 9523kc, 9870kc, 10540kc, 11710kc, and Capetown on 9606kc, Pietermaritzburg on 4878kc, and Durban on 6170kc.

BELGIAN CONGO.—The Leopoldville stations usually come in very well at most locations, and at the present time possibly the best of these is OTC2 on 9745kc, which is really good in the mornings from about 6 onwards. Another one heard well till closing at 6 am is OTM1 on 6295kc, while in addition there is OTM2 on 9380kc used at same time as OTC2 and also in the afternoons. Other outlets are OTM4 on 11720kc, and OTC5 on 17770kc, the latter sometimes heard late at night. There is also OTC4 on 15165kc, but we have not heard of this, one being in use. Other Belgian Congo stations are OQ2AB on 11900kc in Elizabethville, and OQ2RC on 15320kc, Leopoldville, both of which are supposed to be on the air just now.

ALGERIA.—The Voice of America in North Africa has provided the most number of stations from this location, and at various times these have been heard on 6025kc, 6040kc,

WITH OUR S-WAVE REPORTERS REX G. GILLETT, OF PROSPECT, S.A.

BEFORE the war we started a section which gave a brief resume of some of our listeners, and it proved very popular as being a good means of getting to know the other chap, even though he may be a long way away from the reader. We have decided to continue this section, and, as a start for this new series, no better choice could be made than that well-known DX listener, Mr. Rex G. Gillett, of Prospect, S.A. If readers will glance at the imposing list of verifications Rex has received in the last couple of months they will realise just how proficient this chap really is, and I am sure be very envious of some of his rare catches.

We will let Rex tell us something about himself in his own words:—

"I am, indeed, honored to be asked to begin the new series of listeners' write-ups, so will append some items which I trust will be of interest to your readers.

Total number of veries at time of writing is 304, all shortwave. In addition, I have another 170 on the broadcast band

SHORT WAVE NOTES for the October issue are due on September 6. For the November issue they are due on October 11. Please send them direct to Mr. Ray Simpson, 80 Wilga-street, CONCORD WEST, NSW.

Number of countries verified stands at 83, while reports are out to 17 others. "Hams" do not trouble me, but could add another country in Peru if I did include them.

I have only 11 "first" in Australia verifications on shortwave, although others are believed to be, but not officially as such. The "firsts" are Radio Tetuan, Radio Martinique, Radio Balikpapan, KOFA, XDY, XORA, LKQ, British Forces Network, Hamburg, Brazzaville 7000kc, CKLX, HER5.

Most prized veries in addition to those mentioned above are as follows: ZNB, ZYB3, CR6RB, TIPG, OIX4, HHBM, WVIV, NICO, ZPA5, ZEA, PZC Sofia, 7870kc Azores 42.74m.

KOFA is greatly prized to the best of my knowledge no other DX-er, in this coun-

9540kc, 9610kc, 11765kc, and 11880kc. There is also an outlet on 15165kc, and then of course Radio Algerie operated by the French authorities and working on 11835kc, details of which are given in another paragraph. Some months ago there was another Algiers station which was using 12120kc, and this was also a French-controlled station. We believe the Voice of America stations have now been closed down in North Africa, so this only leaves the ones operated by the French.

NORTH AND SOUTH RHODESIA.—There are not many stations in these British African possessions, but most listeners have heard one or two of them. ZQP, located in Lusaka, has been logged recently on its frequency of 9710kc. Best time to hear it is around 3.30 am to 4 am, and at the same time you may be lucky enough to log Salisbury on 3360kc. Salisbury is also listed as being on 3660kc, 6000kc, and a few years ago there was ZEC on 5800kc and ZEB on 6140kc. In addition to the Post Office on 7310kc. Moving to British Bechuanaland we have ZNB in Mafeking which uses a frequency of 5900 kc, and is often heard by early morning listeners.

OTHER COUNTRIES.—Dealing now with other countries in Africa we have the Gold Coast where the transmitter ZOY is located in Accra, operating on 7300kc and heard here quite well till 4 am in parallel with ZOY on 4910kc. A few years ago they also used 6002kc, but this one now seems to be discontinued. In the Sudan there is Omdurman which uses 9650kc and 13320kc, and which is often heard out here. Kenya Colony is a real old-timer, and through its station VQ7LO in Nairobi has been heard for a long time now. Frequencies have changed from 4950kc, 4885kc, 6060kc, 6083kc, 10730kc to its present one of 4855kc. All of these have been heard on occasions, and of course always in the early hours of the morning.

The Egyptian stations have never been very popular out here as their programmes are usually of the purely native type. Just now listeners can log this country on 7865kc over SUX, and sometimes on SUV on 10058kc. Other outlets are SUF2 on 6320kc, while before the war Radio Cairo was logged on 5990 kc. Best time again is the early hours of

try has heard it, if so, it has not been reported in any of the journals. I heard it on one occasion only, and the report was acknowledged as being the first received from Australasia.

My first receiver, bought in December, 1940, was of very doubtful parentage. However, it was instrumental in getting me started in this grand DX hobby. The next set was a well-known five-tube commercial model, tuning from 16 to 50 metres, and this one is kept as a standby. Present receiver is also a commercial model, being of six tubes with seven bands, with a range from 540kc to 23mc.

I use a series of aerials, the backyard being alive with wires, there being about eight in all, controlled by a switching arrangement. The main pole is 43 feet high, and all aerials are of the inverted L type.

I am a member of various radio clubs throughout the world, and am Australian Director of the International League of Short-wave Editors which has representatives in Sweden, USA, Cuba and NZ. In addition, I am Australian representative of the Anglo-American Radio and Television Society and International Short Wave League, South Australian representative for British Short Wave League and since the inception of "Radio Call" DX page early in 1944 have been DX editor.

One of the thrills I have found in the DX game is the hearing of one's name over the air, countries I have had calls from being Australia, Canada, Bulgaria, Borneo, Palestine, Holland, Sweden, Indo-China and Turkey. I have not heard all the calls but DX friends have been kind enough to pass on the message when they have heard a call for me.

I have reports out to 170 stations, which I expect to get back in the near future. There must be a few hundred others given up for lost during the past few years."

I think all readers will agree that Rex has certainly done a very fine job in such a comparatively short length of time, and he must rank as one of the very top-line DX-ers in this country. How he finds time to write to all the stations and log others is a mystery to me. Best of luck, Rex, and you are a worthy competitor for anyone to match themselves against.

Next month we will move to another State and ask another well-known listener to let us know all about his activities in shortwave radio reception. If you like this new series of articles please let us know in your next letter.

the morning. The French station at Tananarive, Madagascar, comes in nicely on 9695kc at 2 am, and is also heard on 6140kc at the same time. Tananarive also has outlets on 6063kc and 10610kc, but we have had no reports of these during the past few months.

There is only one station in British Somaliland and this one is VQ6MI in Margiesha on 7126kc, scheduled from 10.30 pm till 1 am.

In Ethiopia we have Addis Ababa on 9620kc. It comes in very well on some mornings at 2 o'clock with English Church service occasionally, and then there is the newer one ETA, also in Addis Ababa which has again been reported heard on 15070kc around midnight.

French Morocco provides CNR3 in Rabat which operates on 9080kc and is heard quite well around 6 am, while there is another outlet on 16666kc which is very seldom reported as being heard. The Azores Islands can be grouped with Africa, and here we have Ponta Delgado currently heard on 4840kc and previously on 7071kc, and also 11000kc. Finally there is Radio International, Tangiers on 6195kc still being heard fairly well around 6 am.

Proposed Get-Together

It has occurred to the writer that some of our many Sydney short wave readers may be interested in an informal get-together when we could have a good yarn about DX-ing and pass round some of our best veries, &c. On a previous occasion quite a number of us met in town one Friday night for dinner. Something along the same style is suggested again, and any readers who are interested are invited to drop a line to the writer advising what day of the week would be most suitable, with any other suggestions. If we have sufficient replies to ensure it being a success we will publish the date in the October issue. Our own suggestion would be for it to be held on Friday, October 3, but any other date which would suit the majority would be convenient.

NEW STATIONS OF THE MONTH

A GOOD CATCH FROM BRAZIL

BRAZIL: One of our best catches as far as South American stations is concerned is PRJ4 on 4825 kc. While tuning over this band one morning just before 7, we came across this Brazilian at quite fair strength though with a lot of noise superimposed on it. At 7 am a clock is heard striking (do not mistake it for Ponta Delgado which also has clock striking at 7 am but uses 4840 kc). Announcement follows and then usually they play Ave Maria which is a good means of identification. The station is operated by Radio Educadora de Parnaiba, and is located in Parnaiba, Piaui, Brazil. This station does not seem to be on the air on a Monday morning.

PHILIPPINE ISLANDS: A new Philippine station has recently opened up on the 31 metre band being KZOK on 9695 kc. This new one is operated by the Philippines Broadcasting Corporation which also controls the well-known KZPI. The slogan of the new one appears to be "The Voice of the Nation" though they also use "Radio Filipino" when we heard them in an all-night Jamboree which extended from 11 pm till 5.30 am Manila time. In the announcement they gave frequency as 1000 kc and 9695 kc so they are evidently on the broadcast band also. Readers should note that KZPI is now using 9500 kc instead of their two old ones of either 9710 kc or 9695 kc, but at our location it is rather difficult to hear on account of an harmonic of a local broadcast band station.

DOMINICAN REPUBLIC: In last month's issue we mentioned a new Chilean station we were hearing on 7270 kc carrying the same programme as CE1190. We regret we were wrong regarding this one and thanks to Arthur Cushman we now find it to be H12T Monsenor Nouel and the actual frequency 7275 kc. What is more interesting is the fact that this new one is also on 11,900 kc (hence our mistake in confusing it with CE1190). Their slogan is "La Vox de Yuna" and according to the American magazines they send a very nice card confirming reports of listeners' reception. This station closes daily at 3.0 pm with a very tuneless march.

ARGENTINA: Arthur Cushman advised us by air mail that LRS, Radio Splendid, was now operating on a new frequency, 11,970 kc and he was hearing it at very good strength until station closed at 2 pm. On checking for it here we found it audible but only about R5 to R8 from around 1.30 pm. This new station has the call letters LRS2 and frequent announcements are given when one can easily recognise the calls LR4, LRS1 and LRS2. If you have difficulty in identifying this one, check the programme with the other outlet on 9315 kc, but it should easily be found as it is on the same frequency as Brazzaville.

PALESTINE: Just after we went to press last month, the No. 1 Forces Broadcasting Unit which was operating on 7250 kc announced they would be carrying out tests on 7220 kc opening at 7.15 am. Sure enough they opened there at good strength and free from interference and, as from August 1, they are now using this frequency permanently. We have not been able to gather what has happened to JCKW also in Jerusalem and which used 7220 kc. This latter station was on the air until closing at 7 am, July 31, and then on the following morning the new station or perhaps even JCKW again was on this frequency. It is hard to tell which is which now but we may have our verification before we go to press. Lately they gave address as No. 1 Forces Broadcasting Unit, Jerusalem, British Forces, in Palestine.

CEYLON: The Forces Broadcasting Station Radio SEAC seems to be expanding all the time as they are now operating on an additional frequency in the 19 metre band. Their new channel is 15,230 kc and at different times at night carries either the English or the Indian programme. English has been heard at quite good strength around 10 pm, though on other nights at same time, it is Indian. We learn from the latest issue of the "SEAC Times" that their present Chief Engineer, Mr. Blakemore, is shortly returning to England and his relief, Mr. E. Bonong, late of the BBC Engineering Division, is already on his way to Ceylon.

CHILE: For some time we have been hearing a South American station right alongside KETW on 6040 kc, opening at 9.30 pm with a march, but it is only recently we have identified it as CE604 in Santiago. This was due to the help of Arthur Cushman, who

has been hearing the same station in the afternoon till it closes at 2 pm. When the station opens at night with a march it then has news in Spanish for about 10 minutes and is then followed by typical South American numbers until it fades out around 10 pm. At the time of writing we do not have the full address, but hope that by next issue to be able to give more information.

AZORES: While listening to the Mozambique station one morning around 7, we tuned down the band and were surprised to hear the well-known Azores station, Ponta Delgado opening up with clock striking on a frequency of 4840 kc. Considering the power used by this station, it certainly put in a very nice signal and could still be heard at 7.30 am. Listeners should have no difficulty in logging this one as it is only a few kc lower than Mozambique which at that time is easily identified as all announcements are in English. As mentioned in another paragraph, do not mistake Ponta Delgado for PRJ4 in Parnaiba, Brazil, and vice versa.

AZERBAIJAN: The DX-ers session from Radio Australia provided the information that Radio Tabriz was now operating on 11,985 kc. It had previously been reported as being on 12,120 kc and heard in some parts of the country at 11 pm. On this new frequency, or more accurately on 11,995 kc what appears to be Tabriz can be heard in the mornings with native type music till about 6.50 followed by news in native tongue till station closes at 7 am with a march which is more of a Western type than native. As stated last month, this station verifies reports which should be addressed to Radio Tabriz, Tabriz, Iran.

JAVA: Mr. Block, of Petersham, NSW, advises that up till a few weeks ago he had been hearing Radio Malang operating on a frequency of 6630 kc, but since the town was burnt out during the recent fighting, this station has, of course, been silent. Mr. Block has also been hearing a strange station on 6800 kc, but at time of writing had been unable to identify it. A few weeks ago we heard a very strong Russian on this frequency, but, of course, this may not have been the station Mr. Block has been listening to. There are quite a number of other Javanese stations on the air, one of which Bandoeng which we note Mr. Rex Gillett has verified for their 3015 kc transmission.

TEV, HINEMOA: Ship transmissions are always interesting and we are indebted to Mr. W. Gunn, of Christchurch, NZ, for news of the transmitter aboard the above vessel which uses the call letters ZMFQ on a frequency of 4460 kc. This is an inter-island vessel and it transmits alternately from Wellington and Lyttelton. At the Wellington end the station opens at 8 pm NZ time and then at 8.30 pm from Lyttelton. Contact is first made in plain speech and then goes over to scrambled. Reports will be verified and should be addressed to The Radio Officer, TEV Hinemoa, c/o USS, Coy., Wellington. The transmitter is of 500 watts and was originally constructed for a broadcasting station.

NEW ZEALAND: Art Cushman sends details of a new station which opened recently in New Zealand and has been broadcasting on a frequency of 6800 kc, using the call, "Radio Waiouru." This station is located in the North Island of NZ at an Army camp and sends out troop broadcasts beamed to Japan. Programme consists of music and sports items and was on the air from 7 pm till 7.30 pm and also we believe from 8 pm on some nights. We have had no reports of its reception, over here and we have not heard it, but there is a chance that this may be the station Mr. Block is hearing on 6800 kc which we mentioned in another paragraph.

Cards from These

New Verifications

THE following readers have received cards or letters confirming reception of the stations' signals:

Mr. W. Milne, V.C. Suva, WLKS 2465kc, (first report from NZ), WLKS 6105kc, HER3, VUM2, HBF, XGOV 6140kc, WLWK 9700kc, 17,800kc, WLWO 11,790kc, 15,350kc, VUD 9590kc, 11,790kc, 4960kc, Rangoon 6045kc, SBP, Paris 15,240kc.

Mr. A. Cushman, WOOW 9490kc, KZPI, CR8AA, WNRX 9750kc, HR1MB, CR7BU, VLB4, VLA5, SEAC 9520kc, XECC 6185kc, 60w., WRUA 15,130kc, WLWR 9700kc, WLWL 17,955 kc, WRUW 17,750kc, WRUS 15,130kc.

Mr. C. W. Jones, VRR5.
Mr. A. D. Addis, CBLX, WGEO 15,350kc, KNBA-1, KRHO 17,800kc, VLC9, VLC4, VLB10, VLB8, VLA6, VLA5, VLA8.

Mr. A. T. Lane, HER4 9535kc, YHN.
Mr. N. Armstrong, VLR2, VLQ2, VLA8, VLB.

Mr. J. Jensen, CSW, FZI 17,530kc.
Mr. J. Nash, VRR5.

Mr. J. Hughes, Singapore, KRHO, SEAO 15,120kc, CKCS.

Mr. M. Krumbeck, PCJ 9590kc, Noumea 6160kc, WOOC 11,870kc, VLG6, Singapore 15,275kc, VUD10 17,830kc.

Miss D. Sanderson, Saigon 11,780kc, CKNC.

Mr. F. J. Smedley, Saigon 11,780kc, 6190kc, VUD3 9610kc, VUD5 15,190kc, CKNC, OKRA, CKCS, ZLT4, PCJ 15,220kc, SEAC 6075kc, 17,770kc, KEWW, JWV2, Radio Algerie, Radio Brazzaville, Rangoon 6045kc.

A BIG LIST

Mr. Rex Gillett, Tetuan 8065kc, (first report from Australia), Martinique 9705kc, (first postwar report from Australia), LKQ (first report from Australia), LLI 6180kc, (second report from Australia), CE922, YV5RM, Madrid 9370kc, Kuala Lumpur 6045kc, XLRA, XUPA, Sofia 9350kc, 7670kc, Luxembourg, CR7BV 4925kc, Johannesburg 4895kc, Bandoeng 3015kc, CXA19, VUM 2 4920kc, CS2WI, Colombo 4900kc, PCJ 11,735kc, CE1190, VUB2 3365kc, Algiers, 11,835kc, CRARB, JCKW, Warsaw 6100kc, KZPI 9710kc, Malaya 4825kc, Andorra 5980kc, Saigon 6190kc, 11,780kc, Omdurman 13,320kc, WRUL, 11,735kc, WRUA/S 15,350kc, XDY, KEWW, Jafa 11,720kc, Dakar 15,390kc, Leipzig, HB32, HE15, HER5, HBF, KWID 11,900kc, CFRX, ZEA 3660kc, CSW6, XGOE 9820kc, OTC3, FZI 7000kc (first report from Australia), 9980kc, 11,970kc, HCJB 12,455kc, 9958kc, KNBI 6060kc, Noumea 6160kc, Leopoldville 9740kc, XGOA 5917kc, AFN 6080kc, OKRA, VUD 11,870kc, 17,820kc.

Mr. R. Block, VLB10, WCBX, WOOW 15,200kc, WBOS 15,200kc, 11,870kc, WOOW 11,870kc, CKCX, CKCS, CKNC, CFRX, Singapore 6770kc, SEAC 9520kc, 17,770kc, WLWO 11,710kc, WLWL 17,955kc, WLWR 15,250kc, XGOA 9730kc, Kuala Lumpur 6040kc, United Nations WNRX, WNRA, WNRA, WNRX, WNRE, WNBI, VLA8, VLG4, VLC 6-7-10-11.

Mr. R. B. Yeates, KWID, KNBI, KRHO, NAVE, VUD, XGOY, SEAC, WCRC, WOOW/C, KGEX, VLQ2, VLR, VLR2, VLA4, VLW7.

Mr. R. Holland, VLA6, Radio Malaya 4825kc.

Mr. A. Lee, WLWL 9700kc, HCJB 12,455kc.

Mr. E. Moore, Singapore 6770kc, 11,735kc, Noumea.

Our Own Listening Post, WXFG 8860kc, 12,255kc, (first report from Australia), LLI 6185kc, KJEB, CKRX, VLA7, Singapore 6120kc, (first report from Australia), Omdurman 9500kc, 13,320kc, HEU6 15,315kc, SEAC 3395kc (first report from Australia), XENN, Radio Algerie 11,835kc (first report from Australia), Kuala Lumpur 6045kc, WCRO 15,270kc, WNBI 11,870kc, WNRA 11,790kc, WNRX 9750kc, 21,630kc, NAVE 17,840kc.

SOME FURTHER STATION ADDRESSES

WXFG, Alaska Communication System, APO 980, c/o PM, Seattle, Wash., USA.

Radio Martinique, Radio Martinique, 82 Rue de Gueydon, Fort-de-France, Martinique.

Radio Malaya, Department of Broadcasting, Engineering Division (4820 and 6770 kc), Cathay Building, Singapore.

Singapore, British Far Eastern Broadcasting Service (15,275, 15,300 kc, E.c.), Caldecott Hill, PO Box 434, Singapore.

CR7IB, Emissoras de Aero Clube da Belra, PO Box 3, Belra, Mozambique.

XENN, Radio Mundial, Rep. de Brasil No. 25, Mexico City, DF, Mexico.

Kuala Lumpur, Department of Broadcasting, Oriental Building, PO Box 534, Kuala Lumpur, Malaya.

WNRA-WNBI, &c, National Broadcasting Co., Inc., 30 Rockefeller Plaza, New York 20, NY, USA.

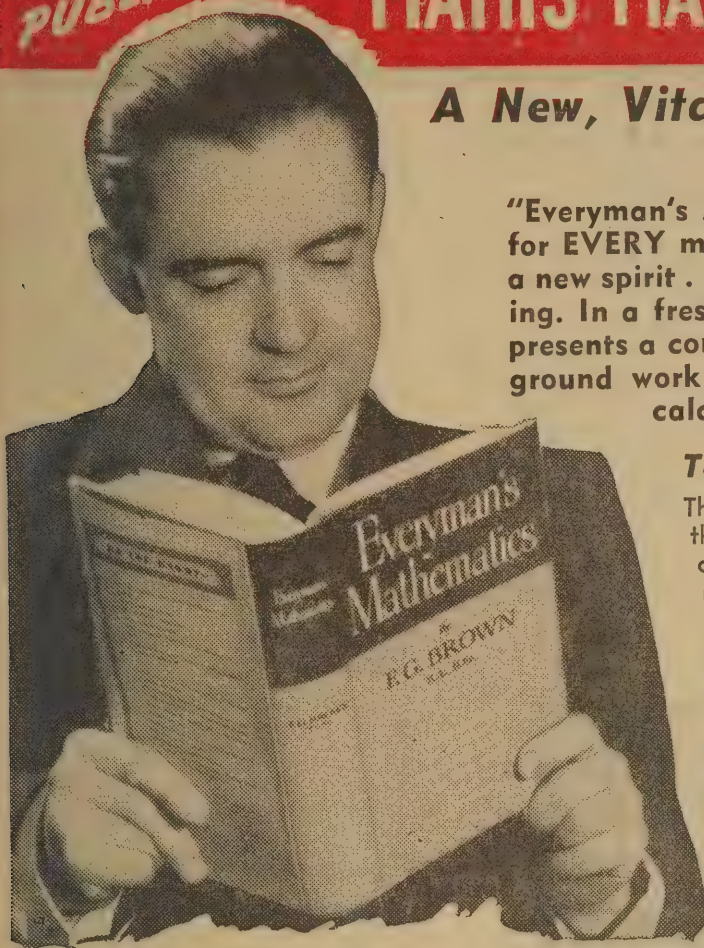
PCV, Engineering Laboratory Radio Kootwijk, Nederlands Admin. of PIT, Kootwijk, Holland.

XECC, Radioemisora XECC, 2 Norte No. 803, Puebla, Pue, Mexico.

HJCA, Radio-Cristal, Apartado Nacional 16-36, Bogota, Colombia.

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Tech. R. H. 9/47.

THE HAM BANDS WITH BILL MOORE

The Australian Contest of the year will be run during the four week-ends in October. Divided into two sections C.W. and Telephony, it will provide Australian Stations with an opportunity to work the world.

THE contest is very similar in nature to those previously run, except allowance has been made this year for single band operation in addition to the "open" all band effort.

The open and single band sections are subject to awards and participants are particularly requested to endorse their logs with the section in which they are competitors.

RULES AND DEFINITIONS:

1. There shall be three contests:—

- (a) Transmitting C.W.
- (b) Transmitting Phone.
- (c) Receiving.

2. Contestants may compete in the "open" events, that is, on all licenced amateur bands, or, in any one or more individual bands by submitting a log for each band. There shall be awards for the "open" section as well as for the winners of each band.

3. The Wireless Institute of Australia Contest Committee shall be the sole adjudicators, and their rulings will be binding in the case of dispute.

4. The nature of the contest requires the world to contact all States of VK.

5. The contest is to be held from 0001 EST, Saturday, 4th October, till 2359 EST, Sunday, 5th October (from 1401 GMT, 3rd October, till 1359 GMT, 5th October) and will continue over the following three week-ends in October at the same times.

6. The first two weekends are to be devoted to PHONE operation, whilst the latter two for C.W. The receiving contest is open at all times and incorporates both phone and C.W. reception.

7. The contest is open to all licenced transmitting amateurs and receiving stations in any part of the world. Unlicenced ship and expedition stations are not permitted to enter the contest. Financial members of the WIA and its affiliated societies only will be eligible for awards in VK.

8. Only one licenced station is permitted to operate any one station under the owner's call sign. Should two or more operators operate any particular station, each will be considered a competitor and must enter his own call sign and submit, in his log, the contacts established by him. This debars persons from entering who have not a HAM licence.

9. Each entry must be signed by each competitor as a declaration of the above statement.

10. Each participant will assign himself a serial number of three figures, as detailed in the contest description. When two or more operators work the same station, each will assign himself a separate number.

11. All amateur frequency bands will be used.

12. Only one contact with a specific station on each of the bands during each weekend will be permitted.

13. Contacts may be repeated on each of the succeeding weekends with the same stations in accordance with Rule 12.

14. Each contact must be accompanied with an exchange of serial numbers and signal strength reports, including readability, strength and tone.

15. The Judge reserves the right to disqualify any station whose tone report is consistently less than T8.

16. Scoring. Three points will be allotted for every contact completed with an exchange of serial numbers and signal records.

17. VK stations will multiply their total score by the number of Countries worked on each band and stations outside Australia by the number of Districts worked on each band in Australia; there being eight in all, VK2, 3, 4, 5, 6, 7, 8, 9. The onus of establishing the identity of new Countries will rest with the participants.

18. No prior entry need be made for the contest, but each contestant is to submit a log at the conclusion of the test showing: date, time (in GMT), band, station worked, in and out serial numbers, in and out signal strength reports, and points claimed for each QSO. Finally, a summary of points and multipliers claimed must be shown at the conclusion of the log.

19. Entries from VK stations must reach the WIA, 191 Queen-st., Melbourne, C.I., not later than 14 days after the conclusion of the contest and overseas logs should reach that address by 31st December, 1947.

20. Awards. Attractive certificates will be awarded to the station returning the highest total in each State or each participating Country. Special prizes, donated by our advertisers, will be awarded, in addition to certificates, to section winners in Australia. There will be no world winner.

21. Overseas stations should call CQ, VK and VK station, CQ DX TEST. It is especially requested C.W. stations refrain from operating during the phone contest and likewise, the phone stations QRT during the C.W. trials.

RECEIVING

1. The rules for the receiving contest are the same as for the transmitting contest, but is open to members of any Short Wave Listeners' Society in the world. No transmitting station is allowed to compete in the receiving contest, too.

2. Only one operator is permitted to operate one receiver.

3. The dates, scoring of points, and logging of stations once on each band per weekend are subject to the same rules as for the transmitting contest.

4. To count for points, the call sign of the station being called, and the strength and tone of the calling station, together with the serial number and signal strength report sent by the calling station, must be entered on the log.

5. The above items must be filled in before points can be claimed, that is, it is not sufficient to log a station calling CQ or TEST. Verification of reception must be made in accordance with the conditions in Rule 3 above.

6. VK receiving stations cannot log any VK stations—only overseas stations. Overseas stations will enter up VK stations heard only.

7. The awards for the receiving contest will be similar for the winners in the transmitting tests.

8. Receiving logs are to be similar to transmitting logs.

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NSW W.I.A. ANNUAL DINNER

THE seventh annual dinner of the NSW division was held at the Dungowan Cafe on August 7. Country members down for the occasion were 2MK, 2PZ, 2XT, 2GA and 2CZ.

The division's president, Mr. M. Meyers, VK2VN, was in the chair. The toast to the PMG's Department was proposed by Mr. John Moyle, VK2JU, and the Superintendent of Wireless Mr. T. Armstrong responded. Introducing himself as an amateur, Mr. Armstrong emphasised the true functions of the Experimental Advisory Committee as a body to assist the experimenter. Many amateurs did not have a true conception of its working and should appreciate it was formed by the department as a means by which amateurs could regulate, to some degree their own activity.

Mr. Ray Priddle, VK2RA, in proposing the toast of kindred societies, covered the work of the IARU, RSGB, ARRL and other national societies.

The president of the IRE (Aust.), Mr. Ray Allsop, replied and, as one of Australia's oldest amateur and foundation member of the WIA, gave some interesting insights into early amateur activity. He traced the sending of the first signals over the Tasman to Bell of Z4AA on 100 meters, later the drift down to 80 meters, where the Americans were heard and contacted. An interesting review of the past in the amateur sphere.

Mr. Peter Adams, VK2JX, welcomed the visitors and representatives of radio clubs. He mentioned that the division had the support of the clubs and it was hoped that shortly a scheme would be evolved, in which the clubs and the division would be in much closer liaison.

Representatives of the St. George and Kingsford Clubs replied, as did country members, 2GA of Ettalong, 2OC of Wyong, and 2CZ of Aberdare.

The toast of the division was proposed by Mr. J. Warren, 2QX, and the president suitably replied.

The success of the dinner rested largely on the efforts of the social officer, Mr. Reg Anthony, VK2TR.

TONGA AMATEURS

MOST 20 and 40 MX operators have heard VR5PL or VR5IP; probably even spent a little time calling them. Mr. Brown, of Ascot Vale, late of Tonga, tells of the unusual origin of their call letters. Tonga itself a virtual paradise—IP stands for "in paradise," and PL for "paradise lost." They both operate from Fua'amotu Airport. 5PL is often on 40 MX telephony. Uses a MOPA and 50 watts, also on 20 MX CW with a bit of a chirp. 5IP uses 20 MX exclusively. Their QTH—Box 25, Nukualofa, Tonga.

THE UHF'S

THE 2KI operating portable from the Gib near Bowral, on 166 MC, contacted both Sydney stations and 2LY at Katoomba. VK3 and VK4 stations have been very fortunate in recent weeks, the 6 MX band opening on many occasions between Victoria and Queensland. July 27 was a field day, 4HR chalking up 14 VK3 contacts; 4ES, 4AW, 4PG, 4CU, 4FM and others breaking through. On August 2 4PG worked 10 VK3's.

On the evening of July 27 the band between NSW and SA opened for a brief period and 2FO contacted 5CU.

4ZU was heard in VK7 during the first weekend in August.

An Australian-wide UHF field day, sponsored by the Victorian division of the WIA, will be held on September 7, between 0200 Z and 0700 Z. All divisions of the WIA and the NZART have been requested to co-operate.

The Victorians will be out in the field in force, while the majority of the NSW gang have decided to operate from home and make good use of the equipment available.

The UHF section of the NSW WIA held their meeting on August 1 and provided a demonstration of 166 MC station working. The secretary, 2PW, installed a complete

WANTED

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166 MC outfit and worked back to 2AHC at Haberfield. 2AGL, with a walkie talkie set, wandered out in the city and worked the station set-up at the meeting.

The following Queenslanders are active on 166 MC—4XG, 4ES, 4FB, 4HR, 4PN.

DX PERSONAL PARS

HERB, W6QD, well-known DX contributor, was heard quizzing a VK9 on the layout in NG.

Two additional Samoans turned up during the month: ZM6AF, 14100, and ZM6AG, 14055kc. The latter using only seven watts.

VR6AA on Pitcairn has been doing the proper thing with the CW gang; was working one CW station, then one telephony station.

VK3ZP is one of the hardy type that ventures on 40 MX with only 2 watts—VK2ASF is another but with one and half watts.

Quite a number of VK's called and later commented on a ZL3 in Christchurch, who

was S9 on 40 MX telephony. He called Q9 frantically for some hours. Just 40 MX out by the sound of things.

W5LIV/J9 is now on the way back to Texas from Iwo Jima; he promises to send an outstanding cards to hopeful hams.

VP4TAD, 14105kc, a nice signal at 2000 hours.

Old-timer VK3JK is quite active on 40 MX telephony.

VK4EL has 127 countries up postwar, with 427 European contacts and 221 G's.

South Africans ZS6IW and VQ2HC have turned up on a couple of occasions before 2000 hours on 14 MC.

W4LEV boasts of a rhombic 390 feet in each leg and that is not all—it's 200 feet high.

OX3BC, 14125kc, won't be with us much long; he will be VE8MB shortly.

LI2B the expedition on the raft was active on 20 MX—14100kc.

(Continued on Page 93)



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OFF THE RECORD — NEWS & REVIEWS

It may be beating the gun a little, but I really was impressed by the recording standard of "The Planets" Suite, by Holst, H.M.V. ED503-09. It is something to look forward to, and is about due for release.

By JOHN MOYLE

Holst, a Swede by ancestry, although an Englishman by birth, belongs to that school of English composers about which there is a definite plus or minus of personal opinion. Sometimes I fear it boils down to a question of Elgar v the Rest, so wide is the gap between outlook and accomplishment.

In this major work of Holst, despite its color and considerable impact, there does not seem to me to be the drive or stature that marked the big works of Elgar.

That does not mean that Holst and the others should be discounted or overlooked. It is rather an attempt to strike a note in the scale of values when descending from the general to the particular.

It is the difference one feels between the man who is most concerned over what he had to say rather than merely how he is saying it.

The Planets is a collection of programme pieces, conceived on a grand, not to say vast scale, in which the planets are portrayed. Thus Mars is the bringer of War, Jupiter of Peace, Mercury the Messenger and so on.

The orchestration is big and broad—in fact that concluding section of Jupiter is quite reminiscent of Elgar's crescendos and use of sheer weight. Holst is at home

with a big band, and uses it with authority and abandon. For the most part he makes plain statements, expressed with clearly defined orchestral sections in which there are few evidences of subtle thought or voice. Strings, woodwind, brass and tympani speak, argue, or combine as the mood demands. Which after all, is not out of place in a work whose sections are themselves elementary in idea.

The "Planets" is a big, brilliant, and particularly on first hearing, astonishingly vivid piece of writing. It gives an orchestra big opportunities to show its paces, its weight, its dynamic range.

This of course is something the BBC orchestra can do in a manner unsurpassed by any other in the world. About the performance there can be no two opinions. It is a magnificent piece of playing. The recording is of the same standard, and on a good reproducer will give you some thrilling moments. Not the least impressive is the opening section on Mars, in which the record has some bass passages which can only be described as thunderous. The needle may

take a beating, but it should at least stay put in the groove—and that is something

Equally well done are the quieter passages as in Venus, bringer of peace, even though it may sound a somewhat uneasy peace! That will depend on whether your eyesight is of the same type as that of Holst.

The last section—Neptune the mystic, is probably the most ambitious of them all. Here the orchestral effects are much less obvious than elsewhere—there seems scarcely an instrument known to us which is not used. I have not sighted the score, but I'll wager not many are unheard in the total of 13 sides!

The mysticism, however, is of a fairly well-known and recognisable type, familiar—I hate to say it—to lovers of creepy ghost films. The introduction of women's voices adds to the filmy floating, nebulous and decidedly damp atmosphere, in which some of the discords are rather hard to take.

The Planets is on all counts a feather in the cap of the recording companies. It is hard to imagine a better performance, or a recording surpassed by present standards.

LOUIS KENTNER (Piano), HENRY HOLST (Violin) and ANTHONY PINI (Cello), "TRIO IN E MINOR, OP. 90 ("DUMKY"), (Dvorak). COLUMBIA DOX.845-8.

For a composer not quite in the front rank, Dvorak maintains exceptional popularity. He is not only a tuneful, but a most human composer, with the ability to strike home with a simplicity which will always bring him affection from all music lovers.

This trio shows up best when in such a mood. Particularly effective is the beautifully played slow movement, which comes upon us in striking contrast to the brusque and short lived first movement. Even here, however, Dvorak's love for the animated folk tune shows up in the centre section. He knows how to obtain the full effect from simple themes. A special note here for the third movement. The presence of six movements guarantees full variety of mood and interest. If the composer is not a master of chamber music, he at least achieves full success within the limits of his work.

As with so many recent recordings, the first rank performers have approached the music in the modern manner, with competence, vitality, and thoughtfulness. The recording is good with no needle troubles. A charming, gracious work.

BENNO MOISEWITZ, Pianist—"Clair de Lune" (Debussy) and "Polonaise No. 9 in B Flat," Op. 71, No. 2 (Chopin). HMV EB.383.

One of the best Moisewicz records I've heard for some time. The haunting Clair de Lune suits his sensitive touch, and he achieves excellent atmosphere. The Polonaise he plays rather quietly, although it is not on quite the grand scale of some others better known. The recording is a good one, and quite easy to play. A good buy.

DENNIS BRAIN (Horn) & DENIS MATTHEWS (Piano)—"Sonata for Horn and Piano," Op. 17 (Beethoven). COLUMBIA DOX.851-2.

As an example of horn playing, these are fine records. It is quite a good thing to obtain the co-operation of such an outstanding artist in such an unusual work. Whether you will find it readily acceptable depends on your approach in such matters. Frankly, I don't think it is Beethoven at his best.

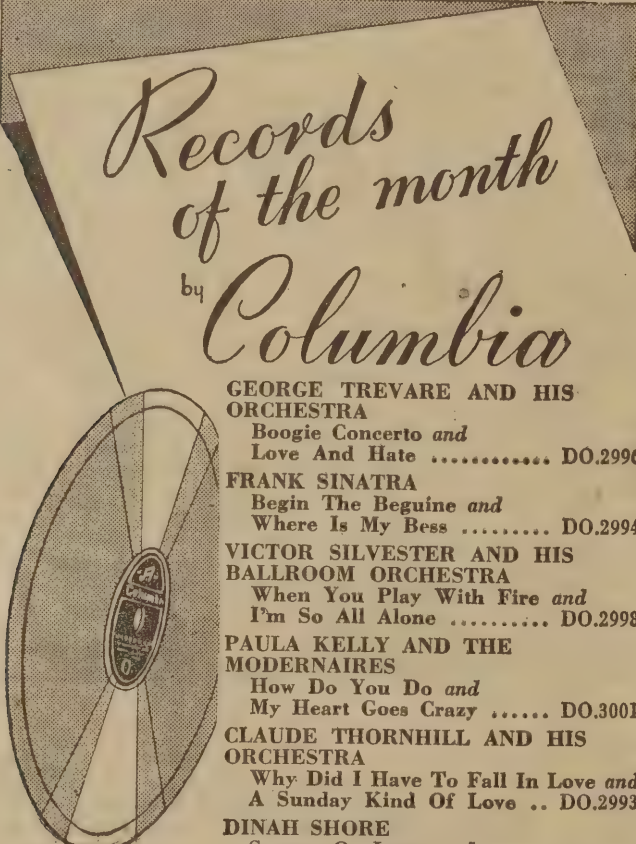
Not one for the man in the street. But what splendid horn playing. A lesson for some of our local virtuosos!

MARIAN ANDERSON, Contralto, with William Primrose (Viola), Franz Rupp (Piano)—"LONGING AT REST" (Gestillte Sehnsucht), (Brahms). HMV ED.492.

One more example of this amazing woman's artistry. I cannot recollect a poor recording of hers. It is unusual music I have not heard before. Frankly, such is the stature of her voice that even the co-operation of a Primrose seems almost an intrusion. But Anderson and Brahms should be good enough for anyone—they are for me.

INDIANAPOLIS SYMPHONY ORCHESTRA. Conducted by Fabien Sevitzky—"Praeludium and Allegro in E Minor" (Kriesler). HMV EB.382.

A fine record this, two sides of mighty playing and vivid recording. I played it first on a new amplifier we had just completed, and it gave me a real thrill. Full honors to all concerned, orchestra, composer,



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FRANK SINATRA
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VICTOR SILVESTER AND HIS BALLROOM ORCHESTRA
When You Play With Fire and
I'm So All Alone DO.2998

PAULA KELLY AND THE MODERNAIRES
How Do You Do and
My Heart Goes Crazy DO.3001

CLAUDE THORNHILL AND HIS ORCHESTRA
Why Did I Have To Fall In Love and
A Sunday Kind Of Love .. DO.2993

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Sooner Or Later and
When a Woman Loves a Man DO.2999

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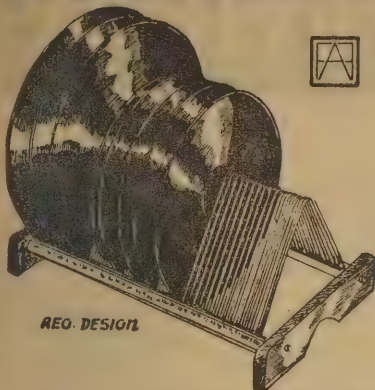
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and arranger-conductor. It may test the quality of the needle, but if your amplifier is good, you'll hear a great performance. Its dynamic range is particularly fine.

NELSON EDDY, Baritone with Orchestra—"Song of the Flea" and "Child's Evening Prayer." COLUMBIA DO.3005.

Sorry, but I just can't take Nelson at any price. He has a voice, but never seems to do anything much with it outside some good films.

That's only my opinion, of course, but it takes more than tonsils to make a singer!

RICHARD TAUBER, Tenor with Orchestra—"Intermezzo" and "Come Back My Love." PARLOPHONE AR.395.

Intermezzo is an old number, right into Tauber's hands, and he makes a good job of it. His voice is wearing well. The less said about the other side, the better.

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LOU PREAGER AND HIS ORCHESTRA—"I Keep Forgetting to Remember" and "Panda Walk (Chin Chin)." DO.3026.

FRANK SINATRA WITH ORCHESTRA—"They Say It's Wonderful" and "The Girl That I Marry." DO.3027.

THE CHARIOTEERS—"Open the Door, Richard" and "One More Dream." DO.3028.

DINAH SHORE AND FOUR HITS WITH ORCHESTRA—"Baby, Don't Be Mad at Me" and "Heartaches, Sadness and Tears." DO.3029.

CLAUDE THORNHILL AND HIS ORCHESTRA—"Sonata" and "I Tipped My Hat." DO.3039.

XAVIER CUGAT AND HIS ORCHESTRA—"Jack, Jack, Jack" and "Yo Te Amo Mucho and That's That." DO.3040.

FRANK SINATRA WITH ORCHESTRA—"You'll Know When It Happens" and "Why Shouldn't It Happen to Us." DO.3041.

CLEMENT Q. WILLIAMS, Baritone, with Alfred Shaw's Strings—"To My Lady" and "The Isle of Innisfree." DO.3006.

HMV

CHARLIE SPIVAK AND HIS ORCHESTRA—"Leave Some" and "We Knew It All the Time." EA.3545.

THE FOUR KING SISTERS WITH ORCHESTRA—"Everybody Kiss Your Sweetheart" and "It's a Pity to Say Goodnight." EA.3546.

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Technical Department

ROBERTSON & MULLENS Ltd.,

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ANSWERS TO CORRESPONDENTS

UNDER THE PERSONAL SUPERVISION OF THE TECHNICAL EDITOR

H.O. (Singapore) writes in appreciation of "Radio & Hobbies," mentioning in particular the articles on service equipment.

A. We are glad to note that you find so much of interest in "Radio & Hobbies" and you can rest assured that we are keen to push up the standard of our publication all the time.

N.S. Camperwell, (Vic.) says he has built the "Springtime Portable" and finds that volume is increased considerably by connecting to the aerial and earth terminals on the loop.

A. The aerial and earth terminals are there for the express purpose of increasing the signal pickup when the loop alone is inadequate. No harm can result, therefore, from attaching a temporary aerial and earth to the set whenever the need arises.

S.F.W. (Richmond, Vic.) sends in his subscription to "Radio & Hobbies" and says he is awaiting supplies of aluminium to make the box for the "R. & H." modulated oscillator.

A. Thanks for your subscription, which has been attended to. Aluminium is in very short supply at the moment, but you may be able to obtain a chassis and box manufactured from steel. Specifications have been supplied to chassis manufacturers, but they unfortunately have their own problems regarding the supply of sheet steel.

A reader from Richmond, Victoria, points out that many 12in. acetate records have an 18-gauge aluminium centre which can be stripped off the outer coating by the simple process of boiling the record for a few minutes. It is not a cheap method of obtaining aluminium, but it is at least handy to know that aluminium centres are available from play-back discs should an emergency arise.

J.B. (RAAF, Japan) is interested in flying model aircraft and asks about transmitters and receivers for radio control purposes.

A. We are not aware of the regulations which might cover such activities in your position but the PMG Department in Australia apparently will not issue permits for such activities by private model flying enthusiasts. We are not in a position to supply circuits or data on this subject.

A. McE. (Dorrig, NSW) has an idea for a radio invention and is keen to get an opinion as to whether it is of value.

A. We do not know the address of the institute you mention in your letter and it is not given in the Sydney Telephone Directory as far as we can see. However, we suggest that you could write to the Australian Radio Technical Services and Patents Co., 47 York-street, Sydney, and seek their advice as to the best steps to take.

A.R. (Topt Tool, NSW) asks about the "Communication Nine."

A. The addition of the noise limiter stage to this set does not in any way affect the gain, except of course, when it is turned to the minimum position. The coupling condenser value is correct, and has been chosen to give a certain amount of bass attenuation.

K.H. (Coff's Harbor, NSW) writes in appreciation of "Radio and Hobbies" and mentions that he has built up two battery operated sets using Ferrotune units.

A. Thanks for your letter and for the appreciative remarks K.H. We are pleased to note that you have had such success with the Ferrotune battery sets and we may some day get around to the task of describing a circuit of this nature.

B.C.H. (Burwood, NSW) renews his subscription to "R and H" and suggests that we should describe a miniature mantel set using the smallest components available.

A. We are watching carefully the supply position of miniature components and will describe a set using them at the first opportunity. As we have explained on previous occasions, it is not sufficient merely to buy the necessary parts and build a set for ourselves. We have to consider

THE following reprints are available on application at our office, 60-70 Elizabeth-street, Sydney. They will be sent, post free, on receipt of stamps or postal notes.

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1 Page 6d.

the angle that hundreds of other readers may want to build the same set and will be disappointed unless they can buy identical parts without too much difficulty.

N.J. (Echuca, Vic.) writes in appreciation of "Radio and Hobbies" and says he has built "Little Jim" which operates very well.

A. Glad to note that "Little Jim" works so well and you could use this for short-wave reception by arranging it for plug-in coils. A page of coil data is available through the postal query service for sixpence. We anticipate that details of one or more small short-wave sets will appear in the short-wave handbook now in course of production.

D.J.H. (North Balwyn, Vic.) writes in appreciation of "Radio and Hobbies" but mentions an error in one of our aircraft articles.

A. Sorry about the confusion of the

names, but things like that happen now and again, despite our care. We note your interest in the receivers and the amplifier and trust that they will turn out to be a success. The 1A3 is a miniature 1.4 volt high frequency diode with a peak inverse plate voltage rating of 330 maximum and a dc output current of 0.5 milliamp maximum. The 1L4 is a pentode RF amplifier which appears to be generally similar to the 1T4 except that it is designed for 90 volt screen operation. It could probably be used in most circuits as a direct replacement for the 1T4.

N.E.J. (Gulgambone, NSW) sends in his subscription and expresses his appreciation of "Radio and Hobbies."

A. Many thanks for your subscription and glad to note that the "1Q5-two" is operating so well.

I.C.S. (Paradise, SA) renews his subscription to "Radio and Hobbies" and suggests that we should expend less space on elementary description of small receivers, chassis diagrams, illustrations, &c.

A. Many thanks for your letter and we are pleased to note that you have located the missing article. We note your comments about the simple receivers, but we have to look after the beginners as well as more advanced readers. Quite a few articles on 8-meter equipment have been featured of late and we will presently be giving attention to the 166 megacycle band.

K.B. (Rosebery, Tas.) advises a change of address and asks about the construction of small portable receivers.

A. Thanks for your letter and the change of address has been noted. "Tom Thumb" is the only set we have described of really miniature type but we will doubtless be developing other small receivers of more elaborate design as the parts supply position improves.

F.P. (Lakemba, NSW) asks about the technique of soldering aluminium.

A. Normal soldering procedure is not effective for aluminium and many of the preparations marketed for aluminium repairs are not very effective. We have never made any special study of the subject but some other reader may be able to help you.

S.L.M. (Balmore, NSW) sends in the circuit of a 4-valve reflex set.

A. Many thanks for your letter and the circuit appears to be a very interesting one. We will be pleased to make use of it in our "Reader Built It" pages.

L.K. (Wyalkatchem, WA) asks whether the "1947 Senior Radiogram" could be arranged for dc mains operation.

A. We would not say that the scheme was impossible, but the set would need to be completely redesigned to meet the new conditions. An immediate difficulty is the high heater current of the 807 valves which would involve a dissipation of over 200 watts in the dropping resistor. Other type valves designed for this class of service would be preferable. Blueprints for the chassis layout have been supplied to manufacturers, and chassis should be available through ordinary channels within the limits imposed by the shortage of steel. The type of dual-wave kit used in the original set was quite satisfactory.

R.W. (Nelson, NZ) sends in a query about the all-band oscillator and expresses his satisfaction with the magazine.

A. The operating voltage is approximately 250 volts. In regard to your second question, we consider it as being quite impracticable. Many thanks for your kind remarks.

L.W.K. (Roma, Qld.) asks whether we can supply a full list of Australian amateur stations with details and addresses.

A. We have a book in course of preparation right now which will contain this and a lot of other useful information. Release of this book will be fully publicised in the columns of "Radio and Hobbies." In the meantime we cannot assist you in the matter.

J.D. (Ermington) sends in an advertisement for the "Wanted to Buy" section, and asks about the "Tex" receiver.

A. Your advertisement has been attended to, and we note your request for more small portable sets. You probably liked "Tom Thumb" in the August issue. It is hard to say what is wrong with your "Tex" receiver, and we doubt whether use of the finer gauge wire would cause the trouble you mention.

(Continued on Page 94)

HOW TO SUBMIT YOUR QUERY

1. Queries will be answered in rotation through the columns of our magazine if not accompanied by a fee for a postal reply.
2. Queries, neatly and concisely set out, will be answered by mail as quickly as possible if accompanied by 1/- in postal notes or postage stamps. Endorse envelope "Query."
3. Back numbers are rarely available but reprints of most circuits, wiring diagrams, and parts lists will be supplied for 6d each, minimum charge 1/-. Thus a circuit, layout, and parts list will cost 1/6 in stamps or a postal note. Endorse envelope "Circuit."
4. Blueprints of exact size chassis layouts with all essential holes and cut-outs will be supplied if available for 2/6. Endorse envelope "Blueprint."

Address your letters to the Technical Editor, "Radio & Hobbies," Box 2728C, GPO, Sydney.

The Ham Bands

(Continued from Page 89)

NEW COUNTRIES

LATEST addition to the countries list are MD1 Oyrenalca, MD2 Tripolotania, MD3 Eritrea, MD4 Somalia and MD5 Suez Canal zone. These prefixes are for the use of British servicemen in the Middle East. The prefix GD, Isle of Man, has been added to the DXCC list.

NEW REGULATIONS

THE first news of the new regulations were broadcast over WIA stations late in July. They are as follows: Frequency modulation is now permitted on the 11 MK band, 27185 to 27455kc., 50 to 54 mc., and all bands higher in frequency. Pulse transmissions can be used on 166-170mc. and all amateur bands higher in frequency. The probationary period of six months on CW for new licensees has been removed. Amateurs are now waiting to see the power limits on pulse and what frequency deviation will be allowed on FM.

BUNDABERG DISTRICT AMATEUR RADIO SOCIETY

UNDER the chairmanship of Arthur Simmonds, VK4PG, well-known UHF man, the Bundaberg Society is well under way. Interested Bananalanders can contact the secretary, Barry Dunn, c/o PO Box 97, Bundaberg. The Morse class is run nightly on six meters and the call sign, 4BD, will be used for the society's transmitter. In Sydney, the Waverley Radio Club is under way; meetings at 13 Macpherson-street, Waverley; the secretary, J. A. Herrington, can be reached at that address.

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Television Sales Story In U.S.A.

(Continued from Page 5)

tions rather than as stock in trade.

In some ways it is a pity that the color complication should have been thrown into the "picture" at all, as the general opinion seems to be that it has retarded the advance of television from the public reaction point of view. The tendency to wait until color is as easily available as black and white is understandable, but there seems little likelihood of this coming about on a satisfactory basis for some time to come.

In Australia this is a problem which is not likely to be a worry in the immediate future, as there is quite a distance to travel before such decisions have to be made. Which lends point to our opinion, expressed nearly two years ago, that our wisest course is to hasten slowly. In the huge backwash of trade and development in USA many mistakes can be absorbed. Scaled down to our requirements, however, such mistakes could easily wreck an industry.

New System of Stereoscopic Films

(Continued from Page 11)

are required, the 10-grade range offers more scope than any other process.

Mr. Maxwell-Harvey predicts that the "art photographer" will come back into his own, bringing to the screen the light and shade effects, and the quality, of the Old Masters. A whole new range of artistic effects, denied to "flat" films, will be opened up as the possibilities of the new medium are appreciated.

This Lancashire kine-expert can claim over 50 years' experience of professional photography, and for 40 years has been engaged on kine-research work. Among his other inventions are a continuous-exposure rotary cine-camera and projector; a seven-color process costing no more than ordinary filming; and an oblique studio background projector and screen.

But, valuable as these inventions are, none is as important, or as revolutionary as the Biopicon, which has been described by a leading British film technician as "the biggest thing since talkies!"

A Simple Photo-electric Cell

(Continued from Page 78)

lights. Placing the hand or a cardboard screen between the lamp and the cell instantly extinguishes the light in the neon lamp (Fig. 3). To increase the minute photo-electric currents for the operation of a relay or similar device, valve amplification is essential. A suitable "electric-eye" circuit is given in Fig. 4. As there are but three components in the amplifier it could be accommodated in the same box as the photo-cell (as in Fig. 5). A small power valve, a 2-volt cell and 100-watt "B" battery complete the installation.

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ANSWERS TO CORRESPONDENTS

S.D. (Little Swamp, SA) writes to support our recent comments regarding nationalisation of radio.

A. Many thanks for your letter and you can rest assured that we will continue to press the matter.

N.N. (Tuntab Falls, NSW) says he has built a five-valve portable receiver but finds that there is a tendency to oscillate at the low frequency end of the band.

A. Such oscillation is usually produced by a resonant effect in the aerial or R.F. coil primary and you may be able to shift the resonance sufficiently by shielding the plate lead of the R.F. amplifier valve. Alternatively, a 10 or 12 mmfd mica condenser across the primary winding may have the desired result.

We have not run comparative tests between loop aerials but generally speaking the larger the loop the better is its signal pickup. Substituting the 6J7G and 6B6G valves in the "Fireside Five" will reduce its gain and may cause trouble with distortion on strong stations. We read with interest your remarks about picking up the American station and also improvements at 2LM, Lismore.

C.H. (North Beach, WA) writes in appreciation of "Radio & Hobbies" but suggests that he would like to see material on frequency predictions and also the circuit of a frequency meter.

A. Thanks for your letter C.H., and for the suggestions. However, it is one thing to be aware of requirements and another to prepare designs and articles for publication.

N.S.K. (North Sydney) is puzzled by the behavior of his signal tracer when connected to a five valve superhet.

A. We can give no immediate explanation for the circumstance you mention, although it is possible that the capacitance of the R.F. probe is sufficient to detune seriously the grid circuits. This probe lead should be unshielded and not too long. A further point is that the chassis under test must be connected to the signal tracer. Make sure that the 58 valve in your signal tracer is not gassy and causing a large bias to build up on grids to which it may be connected. In fact, there should be a small coupling condenser between the grid and the circuit under test.

C. McC. (Hawthorn, Vic.) requests an article on the subject of wire recording and makes a suggestion about a power supply arrangement for 807 valves or similar tetrodes.

A. It is true that we have not published any comprehensive article on this subject and have no immediate plans to do so. From a constructional point of view, the signal is impressed along the wire so that it does not matter how the wire rotates in passing across the magnetic gap. As far as we know, there is no ready source of supply for the wire in this country. With regard to your power supply idea, it appears to be quite workable but we doubt whether the complication is strictly necessary. We had no trouble in obtaining all the power required from the 807 valves in the "Senior Radiogram" and the use of two smaller power transformers and extra rectifier and filter components would be unwarranted. Furthermore, in high powered amplifiers we have found that the peak power capability is adequate provided high capacitance filter condensers are used. The 2J5 modulator appears to deliver a peak power output up to 80 watts without any particular difficulty. If two power supplies have to be used, we feel that the better approach is to use one large transformer with a suitable tapped secondary winding. This avoids the possible difficulties from phasing and also the fact that more current would flow from one half of each secondary winding than the other.

J.F. (Crow's Nest, NSW) renews his subscription and speaks highly of the various "R. & H." receivers he has built up.

A. Thanks for your subscription and we are glad to note your success with the "R. & H." designs. You are certainly an inveterate set builder. We did not select any particular I.F. transformers out of the No. 11 receiver for use in the "Communications Nine." We suggest you go ahead and use them just as they come. The plates were stripped from the large section of the tuning gant to make it identical with the other two sections. You should not have any difficulty in getting one or other of the acorn R.F. pentodes as there are large numbers being sold at a reduced price.

R.M.B. (Hawthorn East, Vic.) says he would like to see more articles about test equipment, longer articles like "The Serviceman Who Tells," but less space to hobbies and aviation.

A. Many thanks for your letter and for your bouquets and brickbats. We have heard

A VERY NECESSARY ITEM!

A few weeks ago, a New South Wales reader finished his first loud-speaker set, which happened to be the "Little General." Much to his delight it operated immediately, tuning in all the stations, but at such weak volume that the signals could only be heard as a whisper in the loudspeaker.

HIS letter to us outlined all manner of tests which had been carried out. Other valves plugged into the set, wiring and voltages checked, components changed around, all to no effect. To illustrate a few points in his lengthy letter, he had drawn a sketch at the end—and in this the cause of the trouble was revealed.

The speaker was of the type now being sold without an input transformer, and the voice coil leads were shown connected directly in the plate circuit of the output valve. The poor 6V6-G was operating into a load of about 3 ohms!

The cure, of course, was simple. We told him to buy an output transformer with the appropriate step-down ratio, connect the primary winding in the plate circuit of the output valve and the secondary winding to the voice coil leads. This done, the set would operate in the normal way.

The voice coil impedance of a dynamic loudspeaker is only a few ohms, whereas an output valve must operate into a load of several thousand ohms if it is to deliver useful and undistorted audio power. An output transformer can overcome this discrepancy by matching the voice coil impedance to the load requirements of the valve.

The impedance transformation ratio of a transformer is equal to the square of the turns ratio. Or, the turns ratio is equal to the square root of the impedance ratio. Assuming that the valve required a load of 5000 ohms and that the voice coil impedance is 2.5 ohms, the impedance ratio of the transformer would have to be 5000 divided by 2.5, equals 2000 : 1. This gives a turns ratio of root 5000, equals approximately 45 : 1.

from one or two readers who have built up the "Vibra-Five" type of set for use in a car, apparently with good results. Very careful filtering and shielding is necessary to keep the ignition noise out of the filament circuit, while the set should not be subjected to excessive vibration. Battery type valves are usually not recommended for this type of service owing to the wide variations in operating voltage. However, none of the readers referred to earlier have reported trouble from this source.

L.J. (Auckland, NZ) has some nice things to say about "Radio & Hobbies" but suggests that we should devote more space to constructional articles for U.H.F. enthusiasts and advice on the conversion and adaptation of Disposal equipment.

A. Many thanks for your letter and we are sorry to note that you apparently have not such ready access to the type of equipment advertised in the columns of our magazine. While we are naturally interested in U.H.F. activities, we cannot see our way clear to devote more space to it than we are doing at the moment, while there are also problems about the articles on Disposal equipment. Apart from the time involved in carrying out the necessary experiments, the actual percentage of readers interested in converting this equipment is very small when compared with our total circulation. We find that most of the equipment is purchased for the value of the parts it contains rather than with any idea of direct adaptation to amateur needs. The A.S.V. receiver is a notable exception to this.

J.H. (Dubbo, NSW) has a four-valve commercial receiver which performs erratically at the low frequency end of the band.

A. It seems a clear case of a failing converter valve which is probably a 106 or 1C7G. Any trouble in the oscillator circuit usually affects the low frequency end of the band first and your observations about the screen voltage, &c., are consistent with the trouble. Reduced voltages due to failing batteries or faulty leads may also cause bother but, assuming that you have checked this point, the cure would appear to be a new converter valve.

D.P. (Mt. Gambier, SA) has built up "Little Jim II" with success and would now like to build another one. He asks whether it is feasible to run the set from a 32-volt house lighting plant.

A. Glad to note that the "Little Jim II" has proved such a success. There would be no harm in operating the 1J6-G from your 32-volt system, provided the voltage variation is not too great between conditions of charge and discharge on the battery. Connect a 125 ohm 20 watt resistor in series with the positive lead returning it to the plus-32-volt potential. You could try returning the B-plus line to the plus-32-volt point, but you may

find it necessary to connect a 45-volt battery in series to boost the high tension supply to 77 volts.

E.J.B. (Caulfield, Vic.) has built up several of our receivers with good results. However, he is not altogether happy about a circuit featured in the "Reader Built It" section of the May issue.

A. Many thanks for your letter and we are glad to note your success with the various sets. The howling trouble in the four-valve job is probably a form of instability and may possibly be cured by connecting a .001 mrd condenser between the plate of the output valve and earth, or from plate to screen. Glad to note that you have appreciated the 6-metre articles.

P.R. (Brisbane, Qld.) sends in an advertisement and suggests he would like to see more articles on one and two-valve receivers in "Radio and Hobbies."

A. Your advertisement has been attended to and we note your request for more small receiver circuits.

H.W. (Mildura, Vic.) has a Disposal transmitter/receiver, and asks us about the capacitance of the tuning condensers.

A. Much as we would like to help readers along these lines, we have simply not had the time or staff available to collect and classify data on ex-military equipment. We are therefore not able to offer you any assistance in the matter. The mere statement that a condenser has so many plates and is double-spaced does not mean very much, since the capacitance is affected by the area of the individual plates and the actual spacing between them.

J.J. (Lewisham, NSW) has a four-valve TRF receiver which operates more loudly with the earth wire attached, but he notices a very small spark when the connection is made.

A. There is no particular mystery about the behavior of your set as it is not at all unusual for the signal strength to increase when the earth wire is connected. It is quite in order also for the set to be more stable under these conditions, not howling when the gain is advanced. The very small spark you refer to is probably an induction effect between the power mains and earth, and once again not an unusual circumstance.

T.H.G. (Seville, Vic.) is interested in a one-valve set in the July, 1947 issue.

A. This set was not a "Radio and Hobbies" design, but was sent in by a contributor to the "Reader Built It" page. If you are keen to build a miniature two-valve receiver, we would suggest the "Tom Thumb" described in detail in the August issue.

J.S. (West Kew, Vic.) renews his subscription to "Radio and Hobbies" and suggests that he would like to see an article on the construction of an infinite baffle.

A. Many thanks for your letter and for the renewal of your subscription. We note your request but cannot promise to do anything about it immediately.

D.B.G. (Melbourne, Vic.) proposes building a small auto receiver using the 1.4 volt miniature valves.

A. One of the difficulties about a car radio is the wide possible variation in voltage between the discharge and charge conditions. We feel that this circumstance, together with the vibration inevitable in a car set would prove too much for the frail filaments in these valves. We have heard of a couple of readers who have built up car sets using the circuit of the "Vibra-Five" receiver with apparently good results. However, we would not be happy to recommend the arrangement you suggest, using the miniature valves.

D.W. (Huron, Tas.) asks whether we can supply the circuit, wiring diagram and parts list for an AC operated set.

A. Your letter was passed on to us by our subscriptions department and we are answering your query in the normal way through these columns. You do not state the type of set you propose to build but, assuming that it is to be a small mantle receiver, we cannot do better than recommend the "Little General" featured in the August, 1947 issue. However, if you are interested in a smaller set, write and let us know your requirements, enclosing the necessary fee and we will select a circuit most likely to assist you.

A.J.McD. (Cronulla, NSW) says he has built the "Fire-side Five" successfully, but would like to see more articles of a simple theoretical nature explaining such things as push-pull operation, phase inverters, phase splitters, and so on.

A. We are glad to note that your "Fire-side Five" receiver has proved so successful and we note also your request about the theoretical articles. Our problem these days is to find enough space to fit everything in but we try to write our articles in such a way that theoretical discussion is bound up in constructional material.

D.O. (Kedron, Qld.) has some nice things to say about "Radio and Hobbies" and says that he would like to see an article on a small mantle receiver using an RF stage and "GT" valves throughout.

A. Thanks for your subscription and the encouraging remarks. Your requirements for a set, being situated so close to your local station, are unusual. However, we would hardly think that an RF stage would be essential provided the aerial coil of a small set was efficient. We are interested in the "GT" set of yours but have not described a set using them to date because of the doubtful supply position.

N.T. (Stantherpe) has recently built up a four valve TRF and is puzzled by certain features.

A. The reaction control usually has a minor effect on tuning but not to the extent mentioned in your letter. It is possible that the reaction and grid windings are too close or that you are using too little detector plate voltage, necessitating a very large reaction condenser. You may find that control of reaction by variation of the screen or plate potential may avoid most of the difficulty. The long leads between the receiver and the high tension supply batteries in your home lighting plant may be responsible for the howling, but there is no serious objection to the insertion of a 10 ohm resistor as mentioned in your letter. Actually, the correct approach would be to connect an 8 mfd condenser across the high tension supply in the receiver. The output load for a valve is not affected by the type of receiver ahead of it. For your 1Q5-GT output valve the recommended load is 8000 ohms, although anything from 7000 to 10,000 ohms would be satisfactory. Your scheme for a tone control is in order except that we would suggest a reduction of the potentiometer value from 0.5 meg. to .05 meg. To build a superhet receiver using the valves you have on hand you would have to purchase a 1A7-GT converter.

A.D. (Kew, Vic.) comments on a recent feature in the "Reader Built It" section and

sends in a circuit which he thinks may be of interest.

A. Many thanks for your letter and the attached circuit. We have duly filed it for future reference and may make use of it when space is available.

L.S. (Double Bay, NSW) is interested in the "Springtime Portable" receiver but finds it difficult to obtain a midget 3-gang condenser.

A. As you say midget 3-gangs are very scarce and you are not likely to be able to obtain one without a deal of luck. We would not suggest ganging together 2 smaller gangs unless you have mechanical facilities and experience. We have never used the solid dielectric condensers in a superhet receiver and are therefore not in a position to give a definite opinion as to their merits or demerits.

A.R.S. (Kyogle, NSW) has acquired an old commercial receiver fitted with 175kc. IF transformers and says he wants to utilise the coils and transformers in a modern superhet.

A. We do not keep a record of commercial receivers in this office and are therefore not in a position to suggest the model number or circuit arrangement of the set you have, nor the color codes for the IF transformers. The chances are that the receiver used a 1A6 or IC6 converter and the oscillator coils should therefore be approximately right for any other of the converters apart from perhaps the 6K8-G. If you decide to use the coil kit you will have to use it in its entirety, as it is not feasible to use coils intended for 175kc. with 465kc. IF transformers.

J.H.T. (Rosalie, Qld.) asks for information on sweep oscillators.

A. We have no information available for distribution on this subject, although we are planning to build up a fairly elaborate CRO for description in the paper within the next few months. This may necessitate a certain amount of investigation into the subject and the publication of relevant data. However, we have no immediate plans of giving information on sweep oscillators as applied to a frequency modulated signal generator.

T.A.D. (Cowan, Vic.) wants to build up a battery superhet around a Kingsley KFT1 Ferrotune unit.

A. We have no immediate plans to describe a battery set using this unit although we know of no obvious reason why such a set should not be successful. According to the data on file, the connections to the unit are as follows: 1—aerial, 2—AVC, 3—signal grid, 4—oscillator plate (through coupling condenser and shunt fed), 5—oscillator grid (with 250 mmdf, 2½% condenser to earth). For further information on this subject or possible use of this unit with an RF stage, we suggest that you write direct to the manufacturers.

A.B.A. (Maryborough, Qld.) is a model plane enthusiast and suggests that we should endeavor to stir up interest by publishing more articles on the subject.

A. We agree that there is considerable interest in this subject, but under present conditions, it is simply impossible to publish articles regularly to look after every interest of our readers. However, we are expanding all the time and hope to be able to fill in a lot of the obvious gaps in the not too distant future.

N.L.M. (Wembley, WA) reports having built up the "1941 Advance" while he was in the RAAF, which gave good reception of the eastern States from a station near Perth.

A. Thanks for your report on the "Advance" and we note also your satisfaction with the "R. & H. Tone Control" which you have incorporated in your radiogram. Best of luck with your aspirations for the Amateur ticket and we trust that the 2JU circuit will give the results expected of it.

Simple C.R.O. And Audio Oscillator

(Continued from page 65)

circle effect. While this is undesirable in more complicated oscilloscopes, it does not detract unduly from the usefulness of this little unit. You can investigate waveshapes, wave frequencies, voltage amplitudes, &c., without any difficulty and, altogether, for its simplicity with flexibility, it would be hard to beat.

In a subsequent issue we hope to illustrate the addition of a very simple time base circuit and possibly an amplifier for the vertical plates or for both vertical and horizontal plates.

In the meantime, go to it and just see how fully our claims are justified.

CLASSIFIED ADVERTISEMENTS

(Continued on Next Page)

WANTED: Small crystal sweeter speaker in good order. K. Nicoll, 12 Halstead-street, Caulfield, Victoria. LF7512.

WANTED urgently: Sunbeam Shavemaster Electric Razor. Contact Rutherford, Box 10, P.O., Uralla.

WANTED: Copies of back issues of any Aircraft Journal, also out of print books on aeroplanes. State Vol. & No. Price to Kevin J. Rogers, Yarrahappini, Box 17, Eungai Rail, N.S.W.

WANTED: Cigarette cards. Pay 2/- complete set 50, 1/6 50 odd cards. Clean. V. Nethway, Box 36, Burra, S.A.

WANTED: Amplifier, speaker in separate case, Mike, run on 240v. power and 6v. battery vibrator pack, 15 to 18 watt output. N. H. Williams, 54 Hall St., Cessnock.

WIRELESS for sale. R. & H. "46 Advance" 5v. D. wave in mantle cabinet, powerful, new. £18/10/-. Also midget portables, using latest parts, good performance. New. All guaranteed. J. Wood, 7 Central-st., Naremburn, Sydney.

SELL: Xmas Portable, giving excellent performance on Eyre's Ten. £17/15/-. Also Little General, complete, minus speaker, £12/15/-. P. D. Page, c/o E. H. Smith, Private Bag, Pt. Lincoln.

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EXCHANGE or Sell: Hickok Mod. 510 Mutual Conductance Valve Tester. Tests button base. Acorn, Magic Eye and types not yet available. Will exchange for good camera. P. Norman, 14 Gerard-st., Cremorne. Phone XM1494.

EXCHANGE: 1-3 gang condenser for a 2 gang condenser. B. Holme, Hillcrest, Crown Rd., Riverstone, N.S.W.

EXCHANGE: Gulbrandsen Radio, 7 valve, P.P. 2A3's, for Camera, 620 Duo, Supreme, or similar type. 76 Cottenham-avenue, Kensington. FF3076.

FOR SALE: Portable gramophone with Garrard pick-up and automatic stop, lots of records. In Good Order, £9. F. Cann, 45 Lime-avenue, Mildura, Vic.

FOR SALE: "Little General" 4v. set in cabinet, new, £13, or best offer, 5ma M.C. meter 10/-, 10in. dyn. spk., with 7000 ohms. Trans. 35/-, 2 single-gang condens. 5/- ea., 1 2-gang condens. 10/6, power trans. 325w. C.T. 60ma, 15/-, valves, 2 6K7-G, new 10/- ea., 1 CV6, EL148 V.H.F. triode, new, 6/6. Write R. Dovatt, Anzac-street, Temora, N.S.W.

FOR SALE: 108 Transceiver, complete, in perfect working order, with following valves in GT series: 1-1A7, 3-1P5, 2-1Q5, 1-1D8. Also 15-plate 6-volt car battery. The lot £5/10/- L. Waters, Bowman-street, Hendra, Brisbane. M2521.

FOR SALE: 107 (2), 1K7, 1L5, 1J6, 1H4, 1Q5 (2), 1P5 (2), 1A7, 1D8, 3A5, 9/- ea.; single gangs, 3/- ea.; 7in. dynamic, 7/6; audio triodes, 4/- ea.; 2-gang, 6/-; 3-gang with dial, 12/6. R. Youmard, 27 Linda-crescent, Hawthorn, Vic.

FOR SALE: Complete set of parts for Little General, including cabinet and speaker, less valves. All new. £8. A. Taylor, 9 Albyn-street, Bxley.

FOR SALE: Little Jim 2, all accessories, cabinet, dial, etc. £5/10/- LX4295 (Sydney).

FOR SALE: Chassis—Communications type, completely wired; includes 4 stage DW unit, 3-460 kcs. IF's, etc.; new condition; also 10in. speaker. £7/15/- the lot. R. Bedford, 29 Emily-street, Murrumbidgee, Vic.

FOR SALE: Little General B.C. almost new, £12. Also 1L5 G, 1M5 G, 1C7 G, 1K7 G valve. Test 90 per cent. £1 the lot. R. Polard, 13 Melrose-street, Sandringham, Vic.

FOR SALE: Large variety radio parts, also many good radio textbooks. Dorman, 6 Robert-street, Willoughby, N.S.W. XL2962.

FOR SALE: Two 1Q5-GT valves, both test 85 per cent. Almost brand new. Apply A. Campbell, 11 Hunter-st., Mortdale. LU1537.

FOR SALE: Valves, 6X5-GT, 6A8G, 6 copies 43-44, Radio Craft, back copies R. & H. Offers wanted. 144 Barkly-street, Ballarat.

FOR SALE: Signal Tracer—7 valves, 2 meters, 1 M.A. meter reads volts 0-1000-ohm meter—A.C. meter, 10 volts, A.C. also V.T. voltmeter; good condition; valves all tested. Cost £40. Sell £15. Sell "Palex" VCT —V Tester, batt., and A.C. brand new, perfect. What offers? "Radio," 13 Logan-street, Maryborough, Vic.

FOR SALE: ATR inverter, 6v. D.C. to 220v., 50 cycle, 85w., 40w. amplified, 4 inputs, ribbon mikes, chokes, transformers, all types incl. C.R.O., metal rects., meters, multimeter, H.V. filter and small H.V. block condensers, valves 813, 866, 214, 805, 1852, 9072, and C.R.O. 3AP1. F. Walker, 151 Wattie Valley-road, Camberwell, Vic. WM3462.

FOR SALE: Good order Radio and Hobbies, as one lot or separately. Oct., '39, May, Aug. to Chris., '40, April, May, Sept. to Chris., '41, Feb. '42 to Sept., '45, Nov., '45 to date. Practical Mechanics, 40 recent issues. Model Engineer, 23 recent copies. Offers, letters to 54 Tambourine Bay-road, Lane Cove.

FOR SALE: 2 1T, 1 3S4, 1 1R5 and 1 1R5 valves for R. & H. "Springtime Portable." New, never used. Also cabinet to suit. Must sell. Apply R. Clegg, 38a Sutherland-street, Cremorne. Saturdays only.

FOR SALE: Lumimage Projector, projects image of small parts on ground glass screen (enlarges .03 inches to approx. 3/4 inch). Suitable enlarging 8 or 9.5 mm. film. Less lamp. £12/10/- or offer. W. Fish, Box 240, Hamilton, Vic.

FOR SALE: Valves in new condition—6F6, 6H6, 6F7, 6J7, 6AC7, 5V4, 12J5, 12A6, 12K8; also a few 807, 809. All approx. half cat. price. W. A. Packer, 194 George-street, East Melbourne, Vic.

FOR SALE: BTH Magnetic Pick-up practically new, 25/- H. Varnes, 38 Marsh Street, West Kempsey, NSW.

FOR SALE: Genemotor slightly used, for 19 Transceiver, complete with all condensers, etc., housed in steel case. No external leads supplied. £2/5/- Genemotor same type, brand new, no condensers, unboxed; handy for spare, £2. Philips trickle charger, 200 mills output; good order, with valve and leads, 30/- (lots other radio parts). Write: "Claremont," Sydney St., St. Mary's, NSW.

FOR SALE: University T.S.T. supertester valve and circuit tester, perfect condition, cheap, £18. J. E. Raven, 482 Chapel Rd., Bankstown, NSW. UY1809.

FOR SALE: New Ferrotune 5-valve receiver in wood cabinet, also electric gramophone. Best offers. T. G. Jones, Barton House, Canberra.

FOR SALE: Cressy Electric Guitar, with 6w 240 AC amp. Good order and condition. £30 or offer. F. Smith, 17 Linda St., Forbes, NSW.

FOR SALE: A.T.5 trans. and aerial coupler, 50 w. R.T., M.C.W., or C.W. Xtal or V.F.O. 2-6V6's, 3-807's; covers 20-40-80 metres; 6 stages metered; easily converted for A.C. Beautiful job. Ideal for hams. Price £20 or near offer. Spare set of new meters. £3 set. G. Laver, Fish Ck., South Gipps., Vic.

Readers wishing to buy, sell or exchange goods are invited to insert an advertisement on this page. The cost is 9d per line; minimum charge 2/3. Approximately 6 words to a line. Advertisements for the next issue must reach our office by WEDNESDAY, SEPTEMBER 10. Dealers' advertisements not accepted.

FOR SALE: Duplex Single 1D8-GT, complete. Min. imax 67½v. batt., phones, £3/15/- Grant, 2 Gentle-street, Lane Cove. JB2869.

FOR SALE: "Little Jim's Mate," complete with headphones, batteries, cabinet. £4. J. Hunter, 6 Cottenham-ave., Kensington, Syd.

FOR SALE: Hickock Diamond Point Jnr. valve tester. A.W.A. all-wave mod. oscillator. Palec oscilloscope, 2¼in. screen. Apilion 10in. speaker; 7500 ohm field, multi-tap transformer. All in good order. Best offer, lot or singly. R. Ziegler, Box 35, Smithton, Tas.

FOR SALE: One 1/1 plate camera, R. and F. front, S. back, dbl. ext. 3 dol. plate hlors., F8 lens Thornton Pkd. Shutter, solid leather carrying case. Also 1 triple ext. ash tripod. £10, or will exchange for service oscillator in good order. J. N. Carter, Belittrees, via Scone, N.S.W.

FOR SALE: Communication Receiver: 12 tube Reliance, 5 bands 550 k.c.—30 m.c., B.F.O., A.V.C., tuning meter, 10in. speaker, plus 1 tube preselector Over 100 countries verified on this receiver. £45. Ray Simpson, S.W. Contributor, R. & H. UF1541.

FOR SALE: One FS6 Transceiver with power pack, extra vibrator, umbrella aerial, phones, mike and key, also 6V. accumulator, and all leads. Bargain at £16/10/- Apply D. Adams, 81 Beaumont-street, Hamilton, N.S.W.

FOR SALE: One Ferrotune Reinhartz, fully complete, except valves, in cabinet, £4/10/- Also 8in. Amplion speaker, 1500 F.C., and 12in. dynamic speak., 2500 F.C., both in good order, £2/10/- the two. Freight extra in each case. Apply D. Adams, 81 Beaumont-street, Hamilton, N.S.W.

FOR SALE: Improved DW FS6 Transceiver with 3V. amplif., Jensen 8in. spkr. Perfect, will demonstrate. New 12V. accum. 6 pole D.T. heavy duty rotary switch. New 7.8 mc. Xtal. Aft. 5, D. Bradshaw, 46 Gould-street, North Bondi. FU5833.

FOR SALE: R. & H. 1941 Portable with cabinet, batteries, as new. Excellent range, tone, etc. Also 45 back copies R. & H. What offers? J. Fensom, Kamarah, N.S.W.

FOR SALE: Little Jim II, R. & H., pan., new batts. and phones. £5. W. Walsh, 4 High-street, Waverley.

FOR SALE: "Tiny Tim II," 3-valve A.C., with or without 6in. Rola speaker. Perfect cond. N. Lander, 8 Oakley-rd., Nth. Bondi, Sydney.

FOR SALE: Bargain, Dynamo Exploder, equal new 25/- Army Wireless Training Set, new 12/6. E. M. Cragg, "Hatherdene," Deepwater.

FOR SALE: University MVA multimeter, AC/DC. Faultless condition, bargain, £6. J. E. Raven, 482 Chapel Rd., Bankstown.

FOR SALE: Valves, guaranteed brand new in cartons—42, 6B6G, 59, 6B6G, 75, 6A7, EL3NG, 6J7G, 6A8G, ABC1, 2-6U7G, 2-AK2, 2-6D6, 1C4, 1K6, 1H6G, 4-1K7G, 5-1L5G, 2-1C7G, 1D4, 2-1M5G. All 14/6 ea. 3-1P5GT, 3-1Q5GT, 1-1N5GT—17/1 ea. 1D8GT—20, 80, C1—10/- ea. Cathode ray tube, 12in. screen. 4V fl. Brand new, sacrifice £3. Sell the lot £32. Apply W. A. Daly, c/o R. Burnett, 6th Avenue, Sandgate, Queensland.

FOR SALE: Calstan V.C.T. A.C. and vib. operation, complete with instructions, valve charts, had lab. use only. Sell £20. R. Hutchison, 6 Macarthur Pde., Dulwich Hill, NSW.

FOR SALE: Jensen A12 Speaker, 750 ohm Field, fitted with Lekmek heavy duty transformer to match 6L6G valves. Push Pull. In perfect order. Best offer accepted. R. Hazel, Box 582 P.O., Griffith.

FOR SALE: Amplifier, 13 watt, compact with Rola, 12/20 speaker, Dynamike, pick-up mike, inputs: valves 6A6, 30 01A, 1K6, 1A7GT, 12B8GT. Part used. Wanted Kodak folding camera, 620 or Duo 620. 90 Birkley Rd., Manly. Phone XU4431.

FOR SALE: or exchange for good mike: 117Z6GT; 6A8G; 6J7G; two 6V6GT's; 10,000 CT spkr. trans.; 80 mil power trans.; and ethertone pick-up. All perfect order, almost new. E. Trigger, Ashford Hill, Gympie, Qld.

FOR SALE: R. & H. D/W "Fireseed Five," new less cabinet. £20. Somerville, Fernvale avenue, W. Ryde, N.S.W.

FOR SALE: World Cruiser Communications 8 chassis, 3 IPT's, H-3 Gang, Bandspread Condensers, special 5 Band coil switch and calibrated dial with Broadcast and 16-45 metre coils, trimmers and padders. Best offer. W. Yates, 5 Connell-street, Toowoomba, Q.

FOR SALE: 5-watt R. & H. amplifier with K10 speaker in box. £7, or offer, exchange for Aegis D.W. coil kit. Stockley, 29 Jackson-street, Balgowlah, N.S.W. XJ3298.

FOR SALE: A.W.A. blk. metal insert instrument knobs, 5d. ea., or 4/6 doz.; power transformers, 110-260V, 500-0-500V, 200 ma, 39/6 ea.; unused FS6 vibrator units, less vibrator, £5/10/- ea. B. Spencer, Derby-st., Walcha.

FOR SALE: Dual-wave single-valve mantel set, with modern dial, complete with phones or speaker, interstate reception, £4/15/- B. Hyles, 14 Tennyson-street, Dulwich Hill.

FOR SALE: "Tex" 2-valve Portable with batteries, no phones. £6. Morrison, 20 First-street, Ashbury, Sydney.

FOR SALE: Miniature Communications Receiver, 5 valves, battery and power pack. Latter works 90-250v. AC—DC. Cost £18/10/- New 5in. Rola speaker goes with deal. C. Williams, Minlaton, S.A.

FOR SALE: Tandem, perfect condition, £18, of exchange for test equip. Write 59 Scott-street, Mortdale, N.S.W.

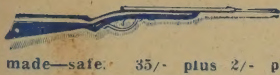
FOR SALE: "Radio and Hobbies," back issues, also "Radio World," 109 issues altogether. £6/10/- or offer. Will sell separately. D. R. Rees, Entrance-ave., The Entrance, N.S.W.

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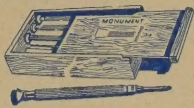
WANTED: Radio & Hobbies, January, 1946, Vol. 7, No. 10. W. J. Anderson, 11 Railway-crescent, Hampton, S.7, Victoria.



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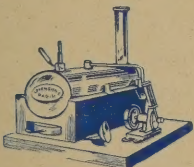
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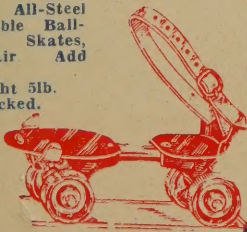


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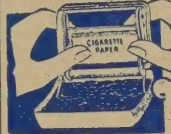
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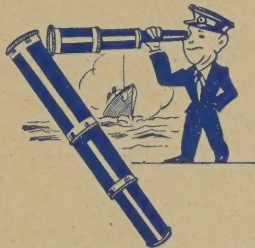
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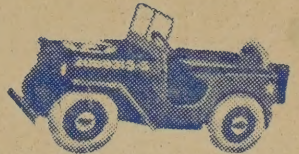


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